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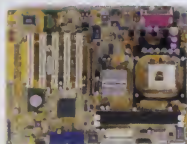
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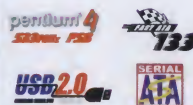
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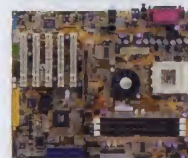
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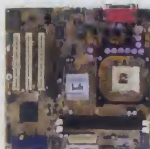
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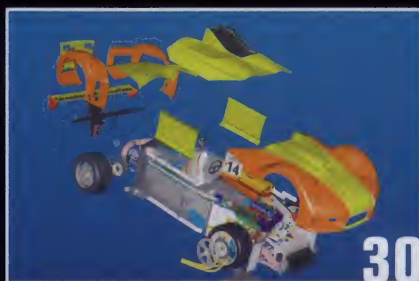
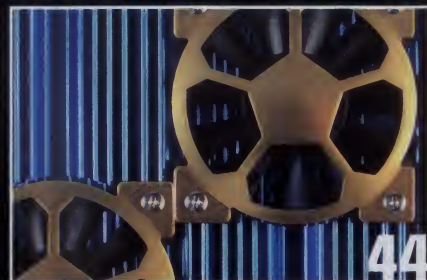
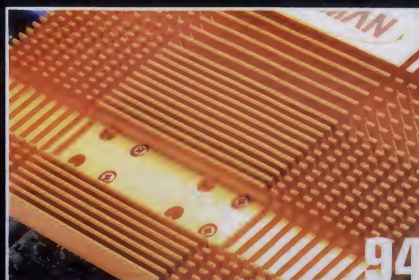
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Atomic contents Issue 22 November 2002



NEWS

08

Technica Obscura – Ode to 8-bit brilliance 12
Z-Access – Wish they all could be... 14
Ground Zero – Cool bananas 16

HOT BOX

18

Flash your box in *Atomic* and earn the respect of Atomicans worldwide, in Australia and New Zealand.

GEAR BOX

20

Woody toot toot! A new section in *Atomic*! Here we'll be chucking in new shiny bits to beautify your box.

SCANNER

22

Viet Cong; The Fellowship of the Ring; Tom Clancy's Splinter Cell

X-RAY: Cable Ties

26

Wireless is where it's at baby. Lose those cables and make your PC, your home and your life tangle-free.

FEATURE: IDF Report

24

Atomican Peter Sbarski won the big competition to attend the Intel Developers Forum on our behalf. Here's his report.

FEATURE: Game servers

34

Inside Telstra and Optus' nasty rooms of game servers. It's a bit like entering the Emerald City.

H2H: Rendering reality

30

Pro 3D cards thrown at each other – Quadro, FireGL the Wildcat slap it around until one comes up on top.

TUTORIAL: It's all in the BIOS

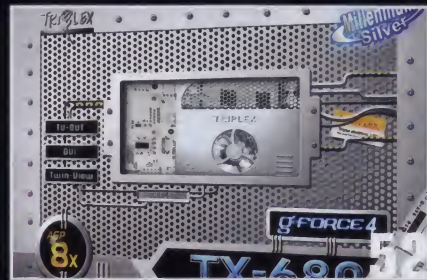
84

BIOS tweaking guides are lame. We show you how to hack into the secret hidden bits that only we know about.

TUTORIAL: The Uber-Linux box project Pt3

88

Make a killer Linux box from your old bits and run a game server, a network server and a distributed computing project.





76



72



74



64



22



68

GAMES

66

Battlefield 1942	68
Mafia	70
Resident Evil	72
Buffy The Vampire Slayer	74
Project Zero	76

I/O

80

Smoke pouring forth? What ho! To the slippery pole! Help comes!

COMPETITIONS

94

Gosh, we do like giving you cool gear, like big-arse cases and fab RAM and P4 mobos and amazing cooling gear. Incredible.

POST APOCALYPSE

96

Lettuce know what you think about issues.

FALLOUT

98

Pubic transport isn't what it semens.

REVIEWS

40

Atomic Benchmarks	42
Framerate	44
Powercolor Evil Commando 2	46
Shuttle XPC SS51G	48
Hercules Fortissimo III	48
Triplex TX-680	52
MSI 845PE Max2	54
Lian Li PC6089	56
Acer Aspire G600	56
Zalman ZM80-HP VGA HeatPipe Cooler	58
Thermalright SLK-800	58
Thrustmaster F1 Force Feedback Wheel	60
AOpen Titanium GT 360-Degree Speakers	60
MSI TV @nywhere	62
LifeView FlyTV-Box	62
Apple iPod for Windows	64
3ds max5	64

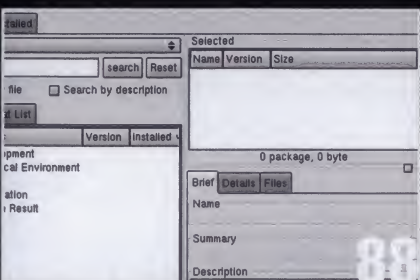
SUBSCRIPTIONS

78

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30



88



26

* bump *

Atomic 22 is just for you. A goodly amount of the regular Atomicness has been injected into this very special issue. Every *Atomic* is special, but *Atomic 22* has a little bit more specialness than usual.

Stuck on the front of the magazine is the second annual *Atomic* CD. We don't attempt to give you a coaster-full of the latest game demos; instead we try and make something that will last a little longer. Last year we gave you the 'First boot' CD, with all the drivers and essential apps you need to turn a fresh Windows install into a useful PC. This year it's the Network Toolkit. Whether you're a sys admin at a large company or run a LAN at home (or want to), this disc has what you need to set up and maintain a good network. We're supporting multiple operating systems and have secured some impressive discounts for full versions of a lot of the stuff. Hope you like it!

The next bit of newness is our new section, cleverly named *Gear Box*. We get sent so many products that are cool, but are hard pressed to warrant a full review, like the endless stream of neons that come through our doors, or the latest innovation in IDE cable technology. Or caffeinated mints. This stuff deserves respect, and so we'll cram it all into *Gear Box*, then you know what's out there and what we think about it.

Looking forward, starting next issue we have another new section. Incredible but true. While it's coming next month, you need to know about it now, because it's your page. We know how you all love to tweak and learn about new and crazy tweekage. We're talking hardcore weird tweekyness here, of the *Atomic* variety. So, we're asking you to send in your best tweaks for publication. Being *Atomic*, we'll naturally be hand-testing each tweak for worthiness. Mr Peppercorn, aka 'Phr33x', will be taking care of that. We've chosen to name this bit *Phr33x' Tw33x*, because, really, there's no better name for it. Email Phr33xTw33x@atomicmpc.com.au with the best you have for making your system scream harder.



Meanwhile, lurking in the background, our site upgrade continues. The guys are working hard making *Atomic v2* everything you want. We have our new hardware too, and that'll be good for at least a couple of years of whatever the Web can throw at us. Visit www.atomicmpc.com.au to check the progress of everything new, except for the black and green, which is still black and green.

The other obvious change, which I'm sure you will have noticed, is that we've put the cover price up a dollar. This has been in the pipeline for a while, as increasing costs have made it a necessity. I truly believe that at \$6.95 we're a bargain anyway. The quality that is *Atomic* is premium, but our price is still discount.

What's not changing is the subscriber price. That's staying at \$49 for a year, or \$80 for two years. If you're an existing subscriber, you can ignore all this stuff and continue to get *Atomic* the easy and cheaper way, if you're not a subscriber, may I humbly point out that there's now yet another excellent reason to join the club.

Have a good month Atomicans. It's almost holiday time and we're anxiously looking forward to spending beautiful sunny summer days inside our dark room, bathing in the blue glow.

Ben Mansill, Editor

atomic

MAXIMUM POWER COMPUTING

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Printed by AIW Printing. Distributed by:

Gordon & Gotch Australia (03) 9805 1650

Gordon & Gotch New Zealand (09) 625 3005

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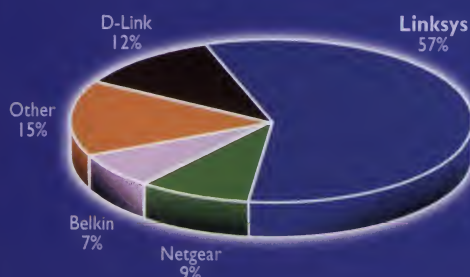
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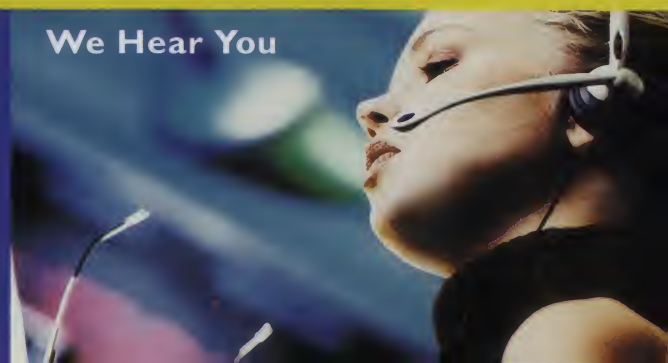
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We Hear You



Short Circuits

Creative recently announced the impending release of the latest product in its soundcard line-up, the creatively named Audigy 2.

Lack of imagination and bad jokes aside, Audigy 2 offers 24-bit/192KHz playback of DVD-Audio. That's in stereo mind you. 5.1 and above is still stuck with 96KHz. Also featured is 6.1 surround and THX certification. Cards are expected to become available in Oz late October.

Blizzard shocked the gaming world when it recently announced its latest game, StarCraft: Ghost. Fans were stunned to learn that Blizzard's latest efforts would be directed not at the RTS genre that has made it famous, but rather in a totally new direction for the company — third person 'tactical action'. When it was further revealed the game would be available only on 'next generation' consoles and would not be making an appearance on PC, time stood still and PC gamers everywhere shed a tear.

The theory that consoles would be the death of PC gaming has seemingly been doing the rounds since the PS1 first hit our shores. Most of the proponents have been quickly shouted down and quietened by the majority of hardcore PC game enthusiasts. Now however, with solid evidence that even the most revered PC game developers can be lured over to the Console side of the force, PC fans are wondering if they'll be left out in the cold.

Are we seeing the beginning of the end for PC gaming? Could this, at the very least, be a forerunner for the loss of certain genres to the console? Perhaps the only good news is that SC: Ghost is being co-developed with Nihilistic, which may mean Blizzard is hedging its bets and not yet throwing its full weight behind a console-only future.

Double, double, double pumped AGP

At the recent Fall IDF in San Jose, Intel released the final AGP 3.0 specification, which most of us have heard called AGP 8x, despite this enhanced transfer speed being only part of the AGP 3.0 package. This comes a month after the first AGP 8x cards hit the market in the form of SiS' Xabre400.

AGP 3.0 is designed to bridge the gap between the long standing AGP 2.0 standard and PCI-Express, which is scheduled to take over the role of both AGP and PCI towards the end of next year. AGP 3.0 does away with legacy features left over from the original AGP standard and adds a few enhancements along the way.

The biggest improvement is the support for 8x AGP, delivering a theoretical maximum bandwidth of 2.1GB/s over the 66MHz AGP bus. In practice, with the large amounts of

onboard RAM that video cards now possess, the need to share with the system RAM is minimal, but more bandwidth is always handy, if only for bragging rights. AGP 3.0 also supports 4x AGP, and most motherboards will autotetect and switch between AGP 2.0 and AGP 3.0 modes.

One other optional feature of AGP 3.0 is support for Isochronous data transport. This is best known as the reliable data delivery method adopted by IEEE 1394, which enhances the delivery of streamed media. This feature is being heavily pushed by NVIDIA in its AGP 8x white papers and will most likely appear as a part of the isochronous backbone of the nForce2 chipset and NVIDIA's new AGP 8x cards.

AGP 8x won't actually appear in Intel's chipsets until the Dual-Channel DDR chipset, codenamed Granite Bay, ships late November. □

Atomic: an official AGDC sponsor



Atomic loves games.

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Atomic loves gamers. To keep you all neck-deep in brilliant, top quality games, the world needs top quality game

developers. Enter the Australian Game Developers Conference (AGDC).

AGDC is the Australian gaming industry's most important event. Held in Melbourne, AGDC brings together developers, designers and coders from across the country, as well as many international attendees. It's the gaming equivalent of the Intel Developer Forum.

What exactly does AGDC entail? Well, add one part new ideas, one part new techniques, one part new technologies and one part professional networking into one large capacity conference centre. Mix well, bake at an insane

temperature for three days and then let sit for between one to three years. The result will be perfectly conceived, beautifully made and brilliantly implemented gaming goodness. In other words, 1 x shitload of fun games.

Fortunately, the fun isn't just confined to developers and their friends. Gamers can get in on the action as well by participating in AGDC's LANfest. LANfest is a 24-hour, 800-person LAN being run by AGDC in conjunction with the main conference. Details on exactly how you can secure a place for LANfest should be in place by the time you read this.

Because AGDC is so important to the Australian and regional game industry, and because Atomic realises this and wants to nurture local talent to the fullest extent possible, we've become an AGDC Official Media Sponsor. By doing our bit to help game developers, we're doing our part to ensure the future of Australia's gaming industry. □

Xbox mod-chips useless

After discovering the widespread availability of mod-chips for the Xbox, Microsoft ordered its development team back to the labs to come up with a more secure method of locking the console down.

The poor overworked Xbox devs must have done something right during those long hours slaving away over a solder station, as a new version of the Xbox is shipping that breaks all currently available mod-chips.

Right now this new hardware is widely available in Australia. If you're planning on buying an Xbox to run Linux, or you want to

play those overseas imports of Halo, make sure you secure one of the original Xbox consoles. Of course, this could be troublesome considering the total lack of external markings or any other form of indication to set this latest version apart from the original. According to Atomic Spy Ring sources, not even a measly serial number sets them apart.

If you can't manage to secure an original Xbox console then you'll just have to wait until Xbox hackers manage to circumvent these new protections, and once again flood us with those tiny little freedom-giving chips of joy. □



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Short Circuits

Investing in a dot-com and living the high-life has certainly proved itself dangerous to continued financial wellbeing. However, former UK head of Apple and now CEO of Scooter.com, Jon Molyneux, recently discovered that dot-com investment can be hazardous to more than just your bottom line. Facing a poor financial future after her husband invested significantly in Scooter.com, Jon's wife Shelley decided to do something about it. Instead of hiring an investment analyst or making some wise investment growth decisions herself, Mrs Molyneux deduced the best course of action was to have her husband 'rubbed out', and then to elope with her 'bit on the side' extra-marital partner. Unfortunately for Mrs Molyneux however, the 'hitman' she'd contracted to do the job ended up not being an overbearing Italian with a speech impediment, but rather a tabloid journalist who had her arrested and scooped a story in the process.

In what seems a replication of the issues experienced with the original VIA KT266 chipset (which VIA replaced with the impressive KT266A chipset), whispers out of Taiwan are pointing towards serious concerns with the performance of VIA's KT400 chipset as it currently stands.

Mobo manufacturers are suitably concerned and are currently working around the clock to find a solution to these issues and this is limiting the supply of boards. Similar problems have been holding NVIDIA's nForce2 chipset back from release for a few months now and it has created a drought for people thirsting for enhanced performance and the latest features, like USB 2.0 and AGP 8x, to pair with their Athlons.

Greek games

Greece recently became the laughing stock of the geek gaming world after its Government passed a law that seemed to effectively ban all forms of electronic gaming. Essentially, the law was worded so loosely that any random geek playing Counter-Strike, Doom or UT in his or her home could have become a convicted criminal. Naturally, the entire civilised world took great pleasure in poking fun at these insanely unlucky Greek gamers. Meanwhile, instead of playing games they knew and loved, Greek fans of fun seemed doomed to a boring life of lazing on couches and being hand-fed grapes by sun-tanned Greek goddesses in skimpy white togas.

Thankfully for all involved, the Greek Government seems to have shifted its position on electronic gaming towards a more sane outlook. According to Greece's Economy and Finance Ministry, 'There is no problem for any individual or for the tourists visiting Greece to use their private electronic or other games such as PlayStation, Gameboy, Xbox et cetera'. No mention was made of PC games, but we assume the Government spokesperson meant to include those as well. At least, we hope so.

It's worth noting that this clarification from Greece's Government comes after a Greek judge earlier ruled the game banning law unconstitutional and, unbelievably, had his ruling subsequently overturned on appeal. Which kind of left everyone in the dark as to whether they would get ten years solid hard labor the next time they felt the urge to frag a few terrorists.

So, what does it all mean for our dear Greek gamers? Well, thanks to their Government's clarification, they're once again free to lock themselves away in darkened little rooms, furiously gibbing every terrorist in sight in a vain effort to beat the Australian Counter-Strike clans and win a place at the next CPL. At least, we think that is the case. However, as the loosely worded law remains on Greece's law books, the ambiguity remains.

Of course, for every bad there is a good (or something like that). Thus, if there's one good thing to have come from the entire debacle, it's that those same Greek goddesses who were earlier fated to handfeed under-used Greek gaming talent, are now free to spend more time with *Atomic HQ* staff! wOOT! ○

Atomican

In the last month, the *Atomic* Superhero cave has been the scene of both anguish and jubilation. Mael, Graymre, Virtuoso and I have been busy trying to remove the *Atomic* Shot(tm) stains from the carpets, building an extension to the garage to accommodate both my *Atomic* SuperCortina and Virt's interstellar spaceship, and putting away any g-strings lying on the floor. Why all this effort you may ask? Well, it's because we wanted the place to look nice when the new Superheroes arrive

(www.atomicmpc.com.au/forum.asp?cat=ge&top=63959).

First off we have Phr33x, who just by looking at his avatar, we could tell was destined for superness. Always there behind the scenes, Phr33xy continuously has everything under control, and handeth outeth to useth verily the *Atomic* 11 Commandments. Even Charlton Heston is jealous of you Phr33x.

Then we have Praetorian, the new holder of the Youngest Superhero title. Prae keeps the channel running über-smoothly and does his best to keep the overall atmosphere welcoming, warm-fuzzy and *Atomic*. Nobody does more for the channel than Prae. Perhaps it would be a good idea to give Prae more control over it. . .

Last month saw our mass media devoted to a particular event. Never has such a catastrophe happened before or been so widely published. Many citizens of the world and shocked and stunned at the events that transpired. It will forever be remembered as a 'Day of Infamy' for many *Atomicans*.

Of course I'm talking about 8/9, the day Virtuoso admitted that he was wrong: (www.atomicmpc.com.au/forum.asp?cat=ge&top=63222). I guess what we can all learn from this is that even Superheroes are fallible.

Plans are now underway for a huge event in January next year. *AtomicanFallout* (www.atomicanfallout.tk) will celebrate the second birthday of our mag with festivities kicking off on 17 January with the main events happening the next day, including a miniLAN, tech tutorials, and even a jumping castle, which is essential for a proper good time. It's going to be heaps of fun, so keep your diaries free on those days.

Until next month folks, remember C is for Cookie, and that's good enough for me.

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- BATTLEFIELD 1942 – A religious experience
- AGP 4X – Solid, reliable and official
- UNLIMITED DIALUP – Leeching freedom
- SPLINTER CELL – Coolest Xbox game yet
- APPLE – Well, the iPod at least

WHAT'S NOT

- BATTLEFIELD EARTH – Painful to watch
- AGP 8X – Standard after the fact
- CAPPED BROADBAND – Email and Web only
- SOFT CELL – *Tainted Love* must die
- BANANA – Looks good, sounds crap

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10:33 Burned
non-Overheating protection



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10:45
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- 4 x ATA133 (RAID ATA133 is optional)
- ASUS CPU Overheating Protection (C.O.P.) Support
- ASUS POST Reporter[®], ASUS MyLogo[®]
- Smart Card/Memory Stick/Secure Digital (Optional)
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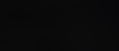
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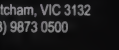
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Ode to 8-bit brilliance

The machines may be long gone but they live on in the emulators we play today and, sometimes, in their music too. Ashton Mills digs 80s nostalgia.



For the generation whose formative years were marked by Soft Cell and New Order blasting on the radio, with the Palaeozoic equivalent of personal computers in the form of ZX Spectrums and Commodore 64s in the lounge room, there are fond memories of the era when computer gaming actually began in the history of humankind.

It was new, exciting, and totally and utterly absorbing. The machines barely had computing resources more powerful than pocket calculators today, and yet the games took a foothold in the hearts and minds of an entire generation – the same people who now program games for PCs and consoles, who write the computer magazines you read, and, as I discovered

a group called Instant Remedy, that's simply brilliant. It brings back a wealth of happy memories. I'm like a chimpanzee in a banana plantation, with a broad smile that stretches from here all the way back to the 80s!

And there's so much to explore! The *Wizball* main theme, written by musical genius Martin Galway (who incidentally also wrote the *Ocean loader* themes), is a wonder for the ears in the soft, trance like mix by Slow Poison. An almost spaghetti western version of the *Impossible Mission* theme by Mahoney & Kaktus is a must have, complete with female vocals, and featuring the original sampled voice 'Stay awhile, stay forever!' The Last Ninja 3 remix by Sonic Remedy

metal band Machinae Supremacy. Most of the band's songs are available in full as MP3 and Ogg format from its homepage at www.machinaesupremacy.com.

Be sure to check out its *Sidology Episode 1* and *Sidology Episode 3* mega mixes for some classic tunes played with all the vigour of metal!

Slow Poison is a more electronic band and has made some phenomenal mixes of songs such as the *Ocean loader* theme, *Wizball*, *Arkanoid*, and *Way of the Exploding Fist* on its album *Karma 64* available from

www.c64retro.com/slowpoison.

And then there's Press Play On Tape, a self-declared 'Commodore 64 Revival Band'. Its album titled *LOADING READY RUN* includes mixes of classics such as *Ghosts n' Goblins*, *Wizardry*, *Monty on the Run*, and *Paperboy*. Press Play has also released a great remix of *Outrun* and an excellent merging of *Warhawk* with *Home and Dry* from the Pet Shop Boys' latest album.


The proverbial icing on the cake however is *The Game Boy Band Video*, a rather well made music video that takes the proverbial piss out of boy band music to a modern upbeat version of Martin Galway's *Comic Bakery*. Head on over to www.pressplayontape.com for the goods.

There are even Internet radio stations broadcasting demo and C64 remix music, and some Websites such as Scenemusic or C64 Audio selling a range of compilation CDs (/me stares in awe). See the links below for the source.

For anyone who grew up in the age of Spectrums, C64s and Amigas this remix community is a joy to the ears. Most tracks are wonderfully produced songs, and the memories they bring make them all the more enjoyable.

This is nostalgia at its best!

Sonic links

- remix.kwed.org remix.kwed.org
- Scenemusic www.scenemusic.net
- C64audio www.c64audio.com
- Press Play On Tape www.pressplayontape.com
- Machinaesupremacy www.machinaesupremacy.com
- c64retro www.c64retro.com/slowpoison 

'Imagine my surprise and joy when I stumbled upon a community of classic game music remixing, otherwise known as 'Bitpop'.'

recently, play the music we sometimes listen to.

The era is still here of course. There are emulators, and pretty much all the games we used to play, freely available on the Web. Looking back I wonder how we managed to play them – with such low resolutions and clunky joysticks that were a health hazard to the hands. But it was the *design* of these games that made them so playable. When you have less than 16 colours and just 64KB of memory to work with, what type of game are you going to make?

Yet Melbourne House, Ultimate Play The Game, Hewson, Firebird, Epyx, Ocean and many others made game after game after game. Many of the genres you play today were born on these machines.

So imagine my surprise and joy when I stumbled upon a whole online subculture I never knew existed, perhaps the ultimate way of paying homage to the golden dawning of games – a community of classic game music remixing, otherwise known as 'Bitpop'.

You may laugh but I'm sitting here writing this, headphones on, listening to a remix of Ocean's classic loader theme, by

turns the tune into a vocal piece that's beautiful and funny at the same time. And then there's *Parallax*. . . the vast, thirteen-minute title music epic which only the most dedicated fan ever listened to completion (like you'll sit staring at your C64 for thirteen minutes without playing it?) which has a plethora of mixes by a variety of musicians, including a solo piano rendition (/me picks jaw up from floor). Most of the music is freely downloadable from a number of sites (see below for links) as high quality 160Kb/s or above MP3s.

Many of the remixed songs are classics by Martin Galway (*Ocean loader*, *Wizball*, *Arkanoid*, *Green Beret* and *Parallax*, to name a few) and Rob Hubbard (*IK+*, *Skate or Die!*, *Thanatos*, *Master of Magic*, *Star Paws*, and many more). Some tracks are made by demo scene musicians (such as Future Crew or Fairlight), using just their PCs and an ear for creating excellent tracks, while others are mixed and recorded in studios.

There are, in fact, a number bands in Europe who tour playing C64 music live!

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Wish they all could be...

The Fall IDF offered up a number of informational gems – not least of which is that Intel thinks ducks are cool. Tim Dean agrees.



I learned some very valuable (and many more not so valuable) lessons at this year's Fall Intel Developer Forum, over in sunny San Jose. I'll proceed to list a few of them – in no particular order: the coming convergence of computing and communications is as inevitable as a train hitting Hugo Weaving; Americans actually do know how to make a good beer – at least in a micro brewery like Redhook; apparently we are currently in the second era of computing (the first being mainframes, and the third is going to be the epoch of converged devices); Intel invested in about a billion little blue bottles of water for the Forum attendees – and was thoughtful and responsible enough to include nutritional information on the label

'Since the introduction of on-die caches, processors now run at significantly different voltages on different parts of the chip.'

(although, funnily enough, each of the two servings in each bottle had 0 calories, 0g of fat, 0mg of sodium, 0g of carbohydrates, 0g of sugar and 0g of protine – certainly not like Sydney water. . .); Serial ATA does actually exist (which could be somewhat of a let down to all the vapourware lovers out there – especially the ones waiting for something/anything from Bitboys – so thankfully we already have Serial ATA II to wait for); maybe it's the troubled times in the US at the moment (and the Forum was held over September 11), but Americans just love to wear flags; we should see a 1 billion transistor CPU in the very near future – probably early next year; in the US, having bulbs is called 'huffing'; and even though Intel will assure you that you won't need new drivers to run a Hyper-Threading-enabled Pentium 4, you *will* actually need new drivers. And a new BIOS. And a new motherboard – but apparently you can use the existing P4 motherboards, and they will work fine (but I never told you – and Intel certainly never told me); William Shatner is thoroughly entertaining, but rambles like a country road, and while he has never seen any of the other *Star Trek*

series, he's heard they suck; Intel is working on a collaborative industry project to put together some kind of PC migration package to make it easier to transfer all your data and settings to a newly bought PC – which sounds kind of silly, but is actually a really cool idea; Pat Gelsinger, Chief Technology Officer and a Vice President of Intel, likes ducks – which might have something to do with the fact that the only current application that Intel can find for its research and development into miniature sensors and communication devices is the monitoring of duck breeding habits on the aptly-named Great Duck Island (where I've heard the infamous 'El Pato Diablo' resides).

And now for the trivial observations. . .

Actually, I might just talk about one of the most interesting sessions, which dealt with the issues that Intel is facing at the moment in terms of cooling chips and PCs. Koushik Banerjee, Manager of the Substrate Technology Research organization for Intel's Assembly Technology Development, hosted the session, and ran us through some of the ins and outs of the whys and wherefores of cooling. Not surprisingly enough (especially to the seasoned overclocker community) we saw that processors running at a higher voltage or frequency also run at a higher temperature, and subsequently are more prone to 'critical failure'.

However, things are made trickier by the fact that even though transistors are getting smaller, thus allowing cooler processors at the same frequency, the frequency of chips is going up so fast that the overall temperature of chips has been steadily increasing over time – and we are reaching the maximum that conventional packaging and motherboard materials can handle. A new phenomenon has also appeared in recent times: hot spots. Since the introduction of on-die caches, processors now run at significantly

different voltages on different parts of the chip. As such, areas like the FPU get very hot, while the L2 cache remains relatively cool. Furthermore, these hot spots are getting hotter faster than other parts of the chip as frequency increases. With die sizes also getting smaller, this is presenting a real challenge to designers to keep the suckers cool.

There are four main ways to cool a chip, starting with basic air-cooling (the HSF we know and love today); extended air-cooling, which includes more elaborate air-cooling devices such as heat pipes; liquid-cooling; and refrigeration. According to Banerjee, liquid cooling and refrigeration are not feasible options for mainstream systems, which only leaves air-cooling. (I did question this view, because it seems the market is willing to pay a significant premium for the highest performance chips, and you'd think that even a liquid-cooled chip that offered 25% more performance for 50% more cost would have some kind of market. Apparently not enough for Intel to devote resources to investigating – or is it? Banerjee let slip that there is a team researching liquid-cooling at Intel, but refused to comment further.)

With cases getting smaller, and air flow becoming a serious problem, the only way that Intel can really tackle cooling is to 'manage the source', and create more power efficient architecture, and improve packaging in order to make the air cooling as effective as possible. As such, Intel is devoting considerable time to improving the efficiency of heat spreaders on the chip. It is developing better thermal interface materials (TIMs – yay) that go between the chip and the heat spreader, with tighter manufacturing controls to keep the bond line thickness (BLT – which is the distance between the core and the heat spreader) more uniform.

So. . . here's a hit prediction for you: I think we might well see a move *back* to the old slot/cartridge processor format, such as seen with the Pentium II, Athlon classic and new Itanium. The cartridge allows better control of the thermal connection and also allows a bigger heat spreader. Awesome – we can expect *another* motherboard swaperoo down the track then. . .

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Cool bananas

Daniel Rutter gets hot under the collar thinking about Atomicans being obsessed with keeping things cool as #%@*!



Overclockers have a bit of a . . . *thing* . . . for cooling.

Air cooling. Water cooling. Recirculating vapour phase cooling. Non-recirculating Esky-full-of-liquid-nitrogen misty-floor cooling.

It's not a fetish. It's a hideous romantic abnormality.

The official reason for all this is simple enough: better cooling equals more overclockability.

The faster you run gear, the hotter it gets. A given chip will increase in heat output linearly with its clock speed, and roughly with the square of its core voltage – so a 25% overclock with a 25% voltage boost means almost twice as much heat.

'You can *pay* for the fans with the money you save by not buying the officially-blessed-by-the-Dalai-Lama RAM modules. Just don't.'

If you don't get rid of that heat, you'll let the smoke out of your chip. Which is a leading cause of tweekers Having One Of Those Conversations with a retailer on the subject of warranty replacements, and how CPUs that have been hot enough for all of the on-chip components to have fallen off probably did not get that way because of a manufacturing defect.

Heat versus speed is not a simple two-variable game.

While you may be able to push a 2.8GHz P4 up to 4GHz with the help of liquid nitrogen, that doesn't mean you'd be able to push it up past 5GHz by pouring liquid helium on it. There are hard limits to how fast transistors can switch, at any temperature.

As I write this, 3.1GHz isn't a mind-blowing result for a plain old air-cooled P4. So it's clearly not sensible to invest in ludicrous water-plus-Peltier active cooling equipment just to get another 20 or so per cent performance. The liquid nitrogen and dry ice crowd only manage to wring another 10% or so out of the hardware by their efforts.

These shenanigans are not unlike

adding a nitrous oxide injection system to your car: they're great on the drag strip, sure, but not helpful in daily driving, unless you're up against the last of the V8 interceptors.

All this, of course, is missing the point. People who hunt that ultimate few per cent aren't doing it because it's vitally important to them that their game frame rate, 3ds max render time or spreadsheet recalc be that much faster. They're doing it because they can, and/or for bragging rights.

At first glance, this looks like just another boys-and-their-toys situation. Until you notice the billion dollar companies that are doing the same darn thing.

Intel and AMD (market capitalisations approximately \$US113 billion and \$US3 billion, respectively, as I write this) have been engaged in a gorilla-versus-chimp slapfight over the PC processor speed crown for ages. AMD had the edge for quite a while, but Intel is now back in the running. Ignoring price, the speed difference has never been enough that users would be likely to notice it for most tasks. But apparently that doesn't matter.

If you ask me, people who'll pay twice as much money for the top-of-line CPU, when the next one down is only 10% slower, need to be wrapped up in damp felt and left in a shady place to calm down. Peak speed of the flagship chip is hardly the most interesting feature of either company's CPU range.

Yet flagship chip speed is, apparently, the only thing they think Joe Average is likely to care about. So that's what all the press releases seem to be about.

I presume this is also why Ford and Holden reckon that sticking tweaked versions of their top-of-range vehicles on racetracks will seriously push along

sales of their six cylinder squishy-suspended fleetmobiles.

If you can manage to avoid this obsession with knowing your PC's a bit faster than the next guy's – not that you can really *see* the difference, of course, but you can still *measure* it – then you've got an advantage.

And you still have the opportunity to show off.

If you want to make the side of your case a square array of a hundred 40mm fans, go right ahead and do it, safe in the knowledge that fewer, larger fans would actually deliver more air, but that the tiddly ones look more entertainingly like electronic chicken wire protecting the illuminated Blues Brothers figurines standing on your video card from the caffeinated beverage vessels hurled in your direction by the less 1337 LAN party attendees. Authentic ambience can be provided by a simple car cigarette lighter, running from the PSU's 12V rail, with a small peristaltic pump dripping commercial glycol smoke fluid onto the element.

You can *pay* for the fans and other decorations with the money you save by not buying the gold-trimmed flagship CPU, top-spec max-clock video card, and officially-blessed-by-the-Dalai-Lama RAM modules. Just don't. And, if you must, say you did.

Like a fiancée who's pretending that the three carat cubic zirconium on her finger's a real diamond, while the money that would have been spent on the rock's actually gone towards buying a house, you can keep the fact that your hardware is actually last month's fashion your little secret.

If being the tweekiest gunslinger in town is your thang, then you probably *are* going to buy top-of-range hardware and upgrade pathologically often. There's really nothing else for it.

But if you're in it for the fun of it, then your money will be better spent on 125 disco-ball key-rings to hang all over the case, a dozen laser diodes arranged around the top, and a windscreen wiper motor built into the base to jiggle it all around.

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- Green laser LED and two neons
- Easy carrying handles
- Scary damn dragon motif
- Shaving mirror on floor of case

The story

This mod has slowly worked its way from a simple repair job on a slightly destroyed bezel to what it is now. After cracking the original bezel I thought I'd gussy it up with some checker plate, but then it didn't suit the rest of the case. A constant sticking point with my friend Mae5tro is the Chinese versus medieval dragon debate, so I had an image in mind but finding one was a problem. I scoured tattooists but

found no flashes I liked. Then, at work, I came across a poster featuring two dragons. Perfect! I set forth with my trusty hobby knife, then I just primed the case flat grey and glued the dragons down with some contact adhesive. I found some glitter and threw it around on some of the larger patches of grey and gave it lots of coats of clear to smooth it out. The full side Perspex came about when I wasn't happy with the 'installed light/overall ambience' ratio.

The Water Tank by Dedge



Technical details

- Pentium 4 1.6a GHz @2.13GHz
- GigaByte 8SRX mobo
- 256MB Kingmax DDR (178MHz)
- Leadtek GeForce4 MX-440
- WD 200BB
- Creative Vibra 128
- Intel 10/100 Nic
- Two 120mm fans @ 6V
- Liquid CC Surge s478 water block
- Rio 800 water pump
- Custom reservoir
- Clear 80mm fan with 3 blue LEDs
- Red LED shining on water block
- Blue LED shining on Southbridge

The story

I was after a nice quiet 'LAN-able' performance box. Originally I had a huge-arse AOpen HQ08 with a water-cooled Duron and it was too awkward to lug around LAN after LAN. After seeing the massive overlocks that Intel's Northwood based P4 was pulling off, I just had to have one :)

I entered into a Web design competition for a Internet cafe called (R)ampage and managed to win this beautiful pre-modded case as well

as an Antec clear 80mm fan. I then set out to buy my s478 waterblock and new reservoir.

I used my pump from my previous setup, whacked it all in with some yum-cha garden hose and voila! I then got my father to help me cut two 120mm holes in the top of my case and wire my LEDs. Now the waterblock glows a nice red and the Southbridge/res a nice blue. I was happy with the end product considering I managed to achieve this on a low-end budget.

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The Tron's Bloodlust Box



Technical details

- AMD Thunderbird 900 @ 972MHz
- Gigabyte GA-7ZX-1 mobo
- Leadtek GF3 Ti200 @ 500/220
- 384MB SDRAM
- SoundBlaster Live! Value
- Sony 32x8x4x burner
- 20GB HDD
- LAN card
- 80mm Thermaltake rear exhaust
- 60mm Thermaltake front intakes
- Two bloodshot eyes
- Homemade rounded cables
- Major Payne case badge
- Bloodlust

The story

After reading a few issues of *Atomic* I made the big call – I would do a case mod! But I'd do something a bit different. . . And so the Bloodlust Box was born! All the cutting was done without special tools. The mouth was shaped by drilling heaps of 5mm holes and filing back the mess left behind. The paint job took a fair bit of work with four coats of blue followed by three coats of clear varnish. The drive faces didn't

escape this treatment either. The finish was finally buffed to a shine with car wax. The crazy, bloodshot eyes are actually painted speaker mesh, hiding two 60mm intake fans, and the nose is a Heavy Water-inspired fan speed adjuster, keeping my gear nice and cool while allowing me to retain my sanity. The internal lighting is taken care of by twin blue neons behind my blue Perspex window while the exterior is given a warm red glow with two strategically placed LED arrays. □

Jin's ^H2O^ Cooling System



Technical details

- AMD Athlon 1.33@1.52GHz
- Soltek 75DRV M/B/266FSB
- 256 DDR RAM
- 30GB HDD
- Cyclone 5 water block
- Radiator with chunky fan on top
- Eheim 1048 water pump
- 32MB GeForce2 GTS Ultra
- SoundBlaster Live!
- Pioneer 12x DVD
- Sony 8x4x32 burner
- Two 92mm intake fans
- Two 80mm outtake fans
- Toys to make inside look cool

The story

I began by spray-painting the interior black to make my neon fully brighten the inside, and finished off with blue and silver outside to make it look cool – which didn't really work. After deciding to use water-cooling to cool down my CPU instead of using a CPU fan, I had to spend a bit of money buying water-cooling equipment. The radiator had to be placed on the top of the case because there was no space for it to fit in, and at that point I regretted buying a midi-tower case. . .

I cut the top bit off a five-litre water bottle and decided to use that as a reservoir, which fitted perfectly inside the case. After setting up all the water-cooling equipment and adding case fans inside, the last job I had left was to add a side-panel using Perspex. After the Perspex was nicely cut, I drilled many little holes so that my intake fan had some access to air. The temperature of the CPU stayed between 27-30°C @1.52GHz, which was very nice, but because of the five fans running it was a bit noisier than expected. □

Coolermaster neon fan

Supplier: Australia IT www.australiait.com.au

Phone: Australia IT (03) 9543 5855 Price: \$25

Fans are great for keeping your case nice and chilly, something that's especially important for overclocked systems. It's just a pity that they look about as interesting as your average thumbtack. Not anymore. First we had clear fans, constructed primarily from clear plastic. Now we have clear fans, but with bright glowing LEDs mounted in the outer edge of the fan mount. The CoolerMaster effort has an Earth-shattering four LEDs, easily bright enough to guide massive container ships into dark harbours from a distance of 4.7 kilometres. OK, so we're lying, but it does look pretty sweet. Especially when you jam a finger into the exposed blades, leaving them covered in a fine film of blood through which the blue light shines spookily. Erm, maybe it's time to stop eating those caffeinated mints. . .



UV paint

Supplier: PC Case Gear www.pccasegear.com

Phone: PC Case Gear (03) 9568 0932 Price: \$19.95

You've cut a bleedin' huge hole in the side of your case, exposing thousands worth of innards for the world to see. Yes, it does indeed look cool, but something is missing. How about some fluoro paint to make your case's guts shine brighter than a Chernobyl baby? You'll need a blacklight neon to get it to work, but once you do your PC will be at home in even the ponciest nightclub.



Gold thumbscrews

Supplier: PC Case Gear www.pccasegear.com

Supplier: PC Case Gear (03) 9568 0932 Price: \$8.80 for 10
Hadn't you heard? Screwdrivers are for Neanderthals. If you're a true case mod head, thumbscrews are the only solution for firmly affixing your case's sides to the chassis. They not only allow you to tinker away without a screwdriver in sight, they also happen to look darn sexy. These revolutionary devices have moved up a rung on the screw evolutionary ladder with the advent of, wait for it, GOLD THUMBSCREWS! Yes, you read that correctly. Ooooooh. Gasp. They're not real gold, else they'd cost more than the rest of your PC's components combined. But they do look very gold like, in a goldy kind of way.



Punisher fan grills

Supplier: PC Case Gear www.pccasegear.com

Phone: PC Case Gear (03) 9568 0932 Price: \$49 for 80mm, \$59 for 120mm

Fan grills used to be cool. Not anymore. It seems every man and his freshly shaved poodle now has a case covered in fan grills. So what is the case modder to do if they want to save those valuable fingernails, but don't want to follow the rest of the crowd like a desperate sheep? One of these evil-looking Punisher grills is a very attractive alternative. If you don't know who the Punisher is, then you obviously never read one of the greatest comic series. Sure, he wore a tight spandex suit like every other superhero, but he liked to kill lots of people instead of just knocking them out in a haze of 'Wam!' and 'Kapowie!' bubbles. Which makes him the coolest damn anti-hero this side of Judge Dredd. Which makes his fan grill also very cool.



Caffeinated mints

Supplier: PC Case Gear www.pccasegear.com

Phone: PC Case Gear (03) 9568 0932 Price: \$7 for 75

When your gaming sessions approach the wee hours, you need a stimulant to keep you fraggin' at your best. The illegal ones cost too much, and have the unwanted side effect of making you believe you're being watched by hidden cameras for a new evil reality show. Or maybe that's just us? Regardless, there are legal stimulants out there that don't have these side effects, and give more than enough oomph to keep you on (the) edge. Just like these Penguin caffeinated mints. Thankfully they tend towards the minty flavour rather than the caffeinated flavour, and a triplet of these has the same amount of caffeine as a can of Coke. So if you gobble twelve at once, you'll be bouncing off the walls in no time.



Lian Li face plates

Supplier: Aus PC Market www.auspcmarket.com.au

Phone: Aus PC Market (02) 9817 2899 Price: \$16.50

So you've just spent 14 million dollars on a new Aluminium case. But your lame drive faces stick out like the proverbial dog's lipstick thanks to their unflattering beige facias. What's the solution? Well, you could always buy a set of brand new drives just so your PC is colour co-ordinated, but even then finding Aluminium drives is going to be a stretch. A very Atomic solution is Lian Li's range of Aluminium drive covers. Peel off the tape cover on the back, slap them onto the front of your drive, and voila, Shiny City here we come. Highly recommended.



Coolermaster fan adaptor

Supplier: Cooler Master www.coolermaster.com

Phone: TBC Price: TBC

80mm to 60mm fan adaptors aren't new. But whack in some baffles to better direct the airflow, and you have something to ponder during those dark and stormy nights. Enter Cooler Master's fan adaptor, otherwise known by the sexy designation of SFC-P68. We can guarantee you'll fit an 80mm fan on a heatsink designed for use with a 60mm fan with this gizmo. But will the 80mm fan cool your CPU as well as the 60mm?



Pyramid II fan speed controller

Supplier: PC Case Gear www.pccasegear.com

Phone: PC Case Gear (03) 9568 0932 Price: \$65

It has been scientifically proven that pyramids are like, fully mystical. They do mystical things, and they even look pretty mystical. So if you build a fan speed controller in a little pyramid, does that make the fan speed controller mystical? Probably not, but that doesn't make this gadget any less worthy of purchase. Nestled within the transparent pyramid is a temperature probe, so as the interior of your case starts to heat up, the fan attached to this controller automatically speeds up. Giving you max rpms when you most need them. Heck, it even has a little LED mounted in the base of the pyramid to make it look even cooler. For what it is, that being a tiny chunk of plastic with some incredibly simple components, it certainly isn't cheap, but if you have money to burn, there's nothing like it. In a word, cool. Literally.



Viet Cong



The LS3D engine is an amazing game engine, capable of rendering vast landscapes chock full of moving vehicles and pedestrians. Just take a look at this month's Mafia review, which uses the same engine, to hear John extolling its virtues.

After playing Mafia we knew it wouldn't be long before another game was developed using this engine, and that game just happens to be Viet Cong.

You'll be commanding a team of American GIs on a mission to rid the world of the loathsome Red Peril which

means you'll be patrolling jungles, crawling through rat-infested tunnel systems and deploying the occasional canister of Napalm.

If you've ever played Hidden & Dangerous or its sequel (which came from the same publisher as VC), you'll have a pretty good idea of Viet Cong's gameplay. You're in command of a squad of Special Forces operatives, each with its own special abilities. The roles you can undertake include Team Leader, Radioman, Medic, Machine Gunner, Engineer, or – if you desire to live for roughly 3.89 seconds – Pointman. Just like Mafia, vehicles will feature heavily, with classics such as the Huey, Chinook, gunboats and the F5 Tiger. Unfortunately there is no sign of

the skinny death dealer, the Cobra.

A feature sorely missing from recent first person shooters is varying penetration rates dependent upon the material bullets are striking, so it's great to see that this is going to be fully accounted for in Viet Cong. Finally, there'll be no more hiding from a hail of M60 rounds behind magical bullet-proof palm trees.

There hasn't been a successful Vietnam War game since the Commodore classic Platoon (although John still has a bit of a fetish for the Special Forces game from a few years back – weirdo!), but Viet Cong looks set to bring this claustrophobic and hellish battlefield to our small screens like never before.

GAME DETAILS

WHY WE CARE: If you've seen the movie *Full Metal Jacket*, you'll know why a first person shooter set during the Vietnam War has wads of possibility for unique gameplay and atmosphere.

DEVELOPER: Pterodon www.pterodon.cz

PUBLISHER: Take 2 Interactive www.take2games.com

PLATFORM: PC **DATE:** Q1, 2003

LOTR: The Fellowship of the Ring



Thanks to the success of the LOTR movie, the gaming market is about to be inundated with LOTR-themed games. We're talking bucket loads, with a total of five due in the next month.

Electronic Arts is releasing The Two Towers hack and slash fest for the PS2, based on its license of the movies, but that's not the version we're looking at today. Vivendi Universal is publishing four games based on its license of the books, one for each console platform, and of course one for the PC. Each of the Vivendi games for the different platforms has been coded

by a different developer. The versions we're looking at in this preview are the Vivendi games for Xbox, developed by WXP, as well as the PC version, developed by Surreal Software.

Both of these titles are for the most part identical in terms of gameplay. However, we've had a good play with beta versions of both of these games, and have to say that the Xbox version is looking to be far superior to the PC – a trend that is becoming disturbingly common these days. It's not just the Xbox version's graphics that wipe the floor with the PC like a pumped-up Gandalf on steroids taking out Saruman as if he were yesterday's trash. More importantly, the control system seems more intuitive on the Xbox. Perhaps this is due to the gameplay style, which is

your standard third person action/adventure fare – console control pads are a much better method of controlling this type of game than the PC's mouse and keyboard combination.

Both games are based very closely on the intricate descriptions of Middle Earth and its inhabitants found in the novels, but in the interests of gameplay have been injected with a large amount of combat. Little details, like the way Frodo's sword Sting lights up when Orcs are approaching, or his oversized feet, show just how true to the book these games are going to be. Fellowship of the Ring is the first of three games from Vivendi to use the LOTR book license – let's just hope it turns out to be a little more exciting than the sluggish first book of the trilogy.

GAME DETAILS

WHY WE CARE: The developers have paid special attention to remaining true to the world that Tolkein so vividly described in the LOTR trilogy.

DEVELOPER: PC = Surreal Software www.surreal.com Xbox = WXP www.wxp3d.com

PUBLISHER: Vivendi Universal Games www.vugames.com

PLATFORM: PC and Xbox **DATE:** Q4, 2002

Splinter Cell



Before we delve into what makes this game so special, let's just clear one thing up right now – in our not so humble opinion, Splinter Cell is going to be THE Xbox game this Christmas. Yes, that's a big call. But when you see Splinter Cell released this November, you'll understand exactly why this prediction is justified. After getting a private demo from the wonderful Owen at Ubisoft, we had no choice but to come to this conclusion.

Since we stumbled upon this under-hyped third person stealthy shooter at this year's E3, it's taken away the coveted Overall Best Game of the Show award at ECTS, and is bound to receive a whole lot more attention over the coming months. Initially headed to the Xbox, the inferior PC version will soon follow. That's correct – inferior PC version. ROAAAAR! But there is logic behind this decision: the developer knows that most PC gamers run GeForce2 MX-level graphics cards, and as a result won't be implementing many of the snazzier lighting effects the Xbox is capable of. While this isn't a happy state of affairs for the PC crowd, a patch should be made available that will allow those with high-end video cards to experience this game the way the developer intended. Then again, don't count on it, as there is a chance that this difference is actually intended to make the Xbox version shine brighter than the PC port. That's the price PC gamers pay for gaming on a platform that doesn't have a standardised set of components.

Think Metal Gear Solid 2, minus the urine scenes, with an extra large helping of graphical goodness, and you'll have a pretty good idea of what Splinter Cell is all about. MGS2 set new standards for graphics on

the PS2, and Splinter Cell is going to do the same for the Xbox. Its awesome graphics are the most hyped feature of Splinter Cell. The static screenshots can't do the visuals justice, so wait until you see it running before you make up your mind.

Using a heavily modified version of the latest iteration of the Unreal engine, the lighting and shadow effects within Splinter Cell come very close to those seen within the almighty Doom III engine. What makes this remarkable is that these effects are being pumped out by a \$399 console, not a \$2,500 Formula 1 PC decked out with a RADEON 9700 or GeForce4.

One of the coolest technologies used by the Splinter Cell engine to enhance the eye candy is called 'soft body physics', which comes into play whenever you pass through curtains or fabric. The result of soft body physics is that these surfaces flap and deform accurately as the player moves through them.

As for gameplay, stealth is the key to success. As a solo operator deep behind enemy lines, you'll need to keep out of sight. To help you do so you are equipped with the biggest collection of gadgets and gizmos seen outside of a 007 movie. Here's a brief rundown of the various goodies you'll need to use to remain unseen while gaining entry to places you're not supposed to be: F2000 Modular Assault Weapon, Multi-Purpose Grenade Launcher, Five-7 silenced pistol, M67 frag grenades, S.L.A.M. motion sensitive explosives, Land Warrior PDA, fibre optic camera, multi-spectrum goggles, Tactical Audio Kit, security camera jammer, chem-flares, emergency flares, lock pick and finally the disposable chemical lock pick.

Each of these devices will prove crucial to the success of your missions, and all add greatly to the gameplay. While playing the beta we saw many of the devices in action, but the most impressive were the fibre optic camera and the lock pick.

With its balanced mix of stunning graphics and action gameplay, Splinter Cell is a title no sane Xbox owner should miss. At twice the length of MGS2, including all of MG's lengthy cut scenes, it should keep you busy for quite some time. O

GAME DETAILS

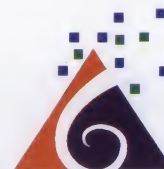
WHY WE CARE: Easily the best visuals yet seen on the Xbox. Taking the Tom Clancy franchise into an entirely new genre should prove to be an interesting ride.

DEVELOPER: Ubisoft Montreal www.ubisoft.ca

PUBLISHER: Ubisoft www.ubisoft.com

PLATFORM: Xbox and PC **DATE:** Q4, 2002

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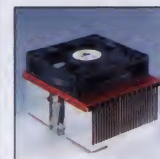


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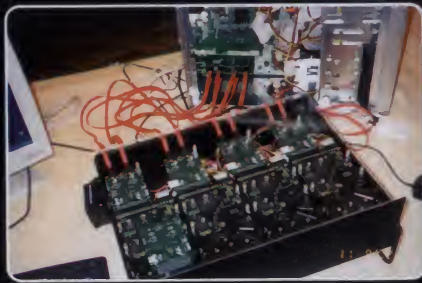
QUIET OPERATION - highly efficient single fan design

Advancing the digital universe: IDF, San Jose, 2002

Intel and *Atomic* IDF winner Peter Sbarski shares the experience of his trip to San Jose.



ABOVE: 4,000 geeks marched through these doors



ABOVE: Serial ATA hard drives in RAID



ABOVE: An actual Serial ATA hard drive

The first Fall IDF (there will be five more until the end of the year) was hosted during the week of 9-12 September in San Jose, California. Around four thousand people attended the event and in my view it was a success.

Day 1

IDF opened with a welcoming note from the Chief Technology Officer (CTO) Patrick Gelsinger and a keynote address from the Chief Operating Officer (COO) Paul Otellini.

Otellini spoke about the imminent convergence of communications and computing, as well as the new desktop, mobile and server technology we may expect to see very soon. He demonstrated two Banias notebooks with integrated 802.11 a/b support, Madison CPU (a pseudo-successor to Itanium 2) equipped with loads of cache and a Pentium 4 4.1GHz (Northwood Core) being overclocked to an insane 4.7GHz.

But the most impressive demo was of a 3GHz Pentium 4 equipped with hyperthreading (HT): an Intel engineer rolled out two 3GHz systems, one with HT enabled and another with HT disabled. He ran a few real life multi-tasking benchmarks, including an Excel macro and Outlook archiving a few thousand messages, then a large PowerPoint presentation and an antivirus scan. In both tests the HT system easily outperformed the non-HT system – visibly at least 20% faster! The most impressive test came when the presenter played a game of *Morrowind* and encoded a DivX file. The game played almost seamlessly on both machines, yet the encoded DivX on the HT-free machine was impossible to watch because it dropped frames like crazy, while the file on the other machine encoded perfectly and played smoothly.

During the keynote Otellini welcomed two guests: Jim Allchin of Microsoft and

Starbucks' CEO Orin Smith. Allchin spoke about the upcoming tablet PC and demonstrated its impressive handwriting recognition. Orin Smith talked about integration of Wi-Fi into Starbucks stores across USA. Now you can drink your coffee and access Internet, if you have a laptop equipped with 802.11b, in any Starbucks coffee shop.

After Otellini's address the technology showcase opened in the nearby hall, where 180 technology companies showcased their wares – and Intel owned a large portion of the space.

Day 2

The theme for the second day was mobile computing, with a particular focus on the upcoming Banias CPU. Banias will be very popular on the mobile market, because it is two-thirds lighter, emits half the heat of an equivalent Pentium 4 mobile CPU and it's more energy efficient – on a CPU-intensive task such as encoding a DivX it only used up seven watts of power. Banias will also feature about 77 million transistors, an optimized FSB for power management, Advanced Power Control, a new way of doing Branch Prediction, and include support for wireless networking.

The last speaker was the Senior Vice President Ronald Smith, who also talked about global connectivity and mobility. In a surprising announcement, at least for me, Smith said that MMX technology (yes, that MMX, from the original Pentium MMX) will be introduced into the XScale Microarchitecture. XScale chips are used with portable handhelds (and phones) and are geared towards wireless devices.

Day 3

Senior Vice President, Michael Fister, and Executive Vice President, Sean Maloney, continued the theme of convergence from day one and showed some new server

tech. Fister announced 2.80GHz and 2.60GHz Xeons and new Gallatin Xeons, which should have a larger cache than the current range. He announced new RAID controllers for Serial ATA and also informed the audience that Serial ATA 2 was in development.

Maloney unveiled a low voltage Xeon CPU and demoed a modular network storage server. There was also a video speech from IBM's Tom Brandicich about IBM's X series of servers and, in particular, Autonomic computing (self-healing/repairing).

Day 4

On the last day CTO Pat Gelsinger entered the keynote auditorium in style – on a Segway – and proceeded to remove numerous electronic devices from his coat. In his speech about the future, Gelsinger mentioned convergence and said that soon one or two devices will replace the numerous gadgets (PDA, mobile TV, phone, MP3 player, etc. . .) he was wearing. During the presentation William Shatner (*Star Trek's* Captain James Kirk) came onstage and spoke a little bit about the future.

Senior Vice President, Sunlin Chou, said that Moore's law was going to continue with nanotechnology and spoke about the efforts Intel was making in that field. According to Chou, closer to the nano-era we will see billion-transistor chips, and eventually nanotechnology will help solve the thermal problem.

Thank you to *Atomic* and Intel for giving me this opportunity to attend the Intel Developer Forum (IDF) – a chance to ogle cutting edge technology and rub shoulders with the best and brightest. It was my great pleasure to represent *Atomic* at IDF, now if only the mag could host a competition to attend next year's E3 or Comdex.

PlayStation 2

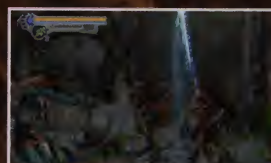


- The latest game from the creators of the original Onimusha.
- Enhanced and remodelled sword-moves produce devastating attacks and combinations.
- Depending on the way you play the game, call on other characters to help you defeat the evil Nobunaga and his demon army.
- Involving story line written by Flagship is brought to life by two renowned and respected Japanese film directors.
- Includes some of the most amazing and realistic FMV sequences ever conceived.
- Unique historical setting for Onimusha 2, combined with breathtaking graphics and sound, create a truly epic game that will push the boundaries of game playing to new heights.

In the year 1560, the warlord Nobunaga, having defeated Imagawa on the battlefield, lost his life by an arrow from an enemy soldier. Yet this wasn't the end of Nobunaga's fate. He was resurrected by the power of demons that reside deep in the underworld and returned to rule with an army of the undead. With Japan on the brink of terror and destruction, a young samurai named Samanosuke appeared and defeated the newly crowned King of the Demons.

However, unbeknownst to all, the nightmare had only just begun.

In the summer of 1573, thirteen years after the original horror, Nobunaga has risen from the underworld once again and started to achieve his old ambition to unify Japan...



ONIMUSHA 2TM

Samurai's Destiny

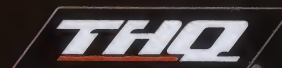
PlayStation 2



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Cable ties

James Wang examines the security, interoperability and future of wireless networking. The evolution of 802.11, the future of Bluetooth and the killer potential of Wi-Fi.

You stare in disbelief and say to yourself: 'There's NO way I can have that many peripherals'. You descend into the jungle, crawling under your desk and behind your box, tracing every wire back to its source, disturbing the ancient spider webs and rusty screws. After an hour of frustration, you have untangled your wires and accepted reality: they all lead to somewhere. You've already decided you're going wireless; the mouse and the keyboard are easy fixes, but what about the network? Wireless networking will surely remove the contamination of unsightly cables – but at what cost?

Keep reading to see how deep the rabbit hole goes.

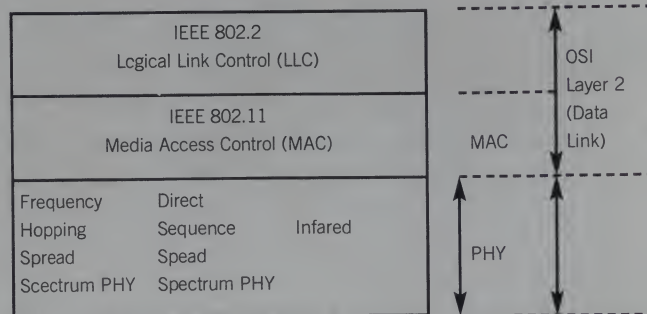
Networking basics

A traditional network links two or more computers via a hub or simply over a cross-over cable. Internet can be shared if one computer acts as the gateway and the rest will leech off its master, which is about all you'll ever need in your home. Larger networks will use routers to link multiple networks and to boost efficiency. The beauty of the 802.11 wireless standard is that it mimics the traditional wired network structure in every way. It allows peer-to-peer networking without the requirement of a hub, which is a big bonus when you scale past two machines. For corporate networks, access points (think of them as radar stations) can be linked together to give an entire building total wireless coverage as well as connection to the established wired networks. Laptop computers get the most benefit with wireless networking as you will be connected and online wherever you go, be it surfing in your garden or flaming in the toilet.

There are three standards that allow establishment of a wireless local area network (WLAN): 802.11, Bluetooth and HomeRF. The 802.11b variant was certified by the IEEE in 1997 and is by far the most dominant today, as it was the first WLAN standard for commercial use. 802.11 comes in many flavours, but 802.11b will be the one for our interests due to its excellent price-to-performance ratio. HomeRF, also operating in the 2.4GHz radio frequency band supports a similar peak throughput of 10Mb/s. Vendor support for HomeRF products dropped significantly as 802.11b became mainstream, and while it has some advantages in streaming media and voice support overall it's slower and much harder to find. If not dead, the HomeRF group is in a critical but stable condition. Bluetooth on the other hand is bathing in its hype and starting to appear in mobiles and PDAs alike. It is almost certain that 802.11 will co-exist with Bluetooth, and they'll complement each other, rather than compete. The only downside to this otherwise happy marriage is the fact that both use the 2.4GHz spectrum, as heavy application of both technologies in a concentrated area will reduce throughput significantly if not well managed.

802.11 Evolution

The Ethernet standard for wired networks is also known as IEEE 802.3. Backed by the same organisation that nailed down the Ethernet specs, 802.11 is an international WLAN standard that started off with a peak bandwidth of 2Mb/s. As this was very limited in comparison to its wired brethrens at 10/100Mb/s adaptation was very low. By 1999, the IEEE formed two new standards based on the original specification and named them 802.11a and 802.11b. Due to market conditions, 802.11b became commercialised much faster than the 'a' variant and is now widely available.



ABOVE: At the very bottom, the physical (PHY) dictates three methods for wireless transmission. Infrared is seldom used due to 'line-of-sight' limitations. Direct Sequence Spread Spectrum is used by 802.11b while 802.11a uses Frequency Hopping Spread Spectrum to obtain higher bandwidth. Both are abstracted via the Media Access Control, which is only about 70% efficient for data exchange.

The Physical Layer is the interface that sits between the silicon and the radio waves. It supports three transmission methods of which 802.11b utilises Direct Sequence Spread Spectrum (DSSS). Spread spectrum uses more bandwidth than is needed by transmitting the data at multiple frequencies. By doing so, the effects of interference are reduced while still keeping overall power consumption the same. Direct Sequence decides how the data is spread by modulating it with a code or signature. Modulation results in the data stream being assigned to different frequencies and the receiver will pick up based on this frequency range and de-modulate using the original signature. The net effect is increased reliability by using multiple frequencies with the trade-off of bandwidth.

Received signals are processed through the Media Access Control, which is also responsible for encoding and security protocols. The MAC uses a 'listen before talk' scheme to avoid channel clashes with other devices. This detection mechanism (Carrier-Sense Multiple Access) is similar to those used in wired Ethernet LANs.

The MAC used in 802.11b is known for its relatively poor efficiency, giving only around 70% of the peak 11Mb/s output. In all practical purposes, it is unlikely you'd exceed 7Mb/s for any sustained use. To maintain signal integrity over long distances, 802.11 automatically toggles down from 11Mb/s to 5Mb/s if needed. Improving signal strength is also possible by allocating more juice to the antenna, which has a peak of 1mW for receivers.

There are two ways you can set up a wireless network: ad hoc (peer-to-peer) or infrastructure mode. A wireless ad hoc network does not need any access points. Two Network Interface Cards (NIC), be they USB, PCI or PCMCIA, are enough to start sharing files and fragging friends. Using ad hoc mode, wireless-to-wireless transfers tend to be faster than infrastructure mode as signals need not be relayed via an access point. The range however is only half, as one computer that cannot reach another will not be able to use the one in between to relay data. On the other hand, in infrastructure mode all wireless cards talk to an access point. The access point acts as the local nerve, linking all those in its range to the larger network, including the fixed network. Most access points will also connect to your cable modem to allow

hardware-based Internet sharing.

802.11 come in a variety of flavours both currently and in the works. The two production variants are 'a' and 'b' while 'g' and 'e' are still been finalised. While 802.11b (Wi-Fi) can hardly stream MPEG2 video with its bandwidth, the 'a' variety (or Wi-Fi5) can do so and with much to spare.

Using the 5GHz band allows a peak bandwidth of 54Mb/s – almost five times faster on paper. In the real world however, it suffers the same core inefficiencies as 'b' due to manufacturers using the same MAC to reduce design costs. Wi-Fi5 is said to have a smaller range and is also incompatible to normal Wi-Fi. This means ordinary Wi-Fi access points and cards will not talk to Wi-Fi5.

Currently, vendors are bridging this gap by working on access points that will understand both standards. To maintain backward compatibility to Wi-Fi, a new 802.11g is also being developed, which offers twice the throughput of Wi-Fi at 22Mb/s and uses both the 5GHz and 2.4GHz band to obtain this. There's a plethora of other suffix letterings being pushed by many groups but 'a', 'b' and 'g' will be our main interest for the foreseeable future.

Hacking over the airwaves

For businesses wireless security is now a major concern and has received much public scrutiny. The encryption used on 802.11 devices is known as WEP (Wireless Equivalent Privacy). As the name would suggest, it is designed to offer the same degree of security as wired Ethernet would offer. This means that hacking a network over the airwaves from the parking lot should be as difficult as hacking directly from an exposed cable.

Unfortunately, this is not the case. Although WEP uses RC4, a 40-bit secret key, part of the key known as the Initialisation Vector is transmitted in the data stream to assist in rapid decoding. The problem is this key will repeat itself given enough data is transmitted. After monitoring enough data, motivated hackers can sniff out the key and break into the network. To make things worse, tools designed to crack WEP keys surfaced on the Net around June last year that allowed low resource 'script kiddies' to easily penetrate WLANs.

For most network administrators though, the problem is not with WEP but rather with implementing basic security routines. A report by Tyson Macaulay of Electronic Warfare Associates in Canada stated that 80% of wireless networks did not have any security measures implemented. It went on to say that this is as bad as installing a LAN socket in the middle of a parking lot for public use! Clearly the problem lies more with managing the networks than with WEP.

With some rudimentary management, the security of any network will be greatly enhanced. A good start would be to change the default settings in newly acquired wireless hardware and check you are not using channels already present in your area (neighbours). While not

totally hack-proof, WEP is still a reasonable barrier to entry. Activate your WEP and change access keys at frequent intervals if you are feeling uneasy about the van across the street. Default settings on wireless cards also use maximum power output, which is hardly necessary. It not only creates unnecessary chatter and but sends your signals far into the open – perfect for the snooper.

To be or not to be

Whether you should make the leap to wireless depends chiefly on your interests. Prices have come down considerably and scalability behind two machines without the need of a hub is a big plus. With WECA now in full swing to certify the 'Wi-Fi' name to cards that pass their inter-compatibility tests, you can buy with reasonable confidence.

If you are uncertain about the longevity of the 'b' standard then don't fret. The support and adoption is enormous. If you work with laptops, then 802.11b should be on your next upgrade list; the benefits of roaming at home and at work/uni with the added cachet that you have the option to hack into the pack brings an unhealthy grin. Ping you ask? Not a problem: a well-configured WLAN will bring you sub 50ms gaming goodness.

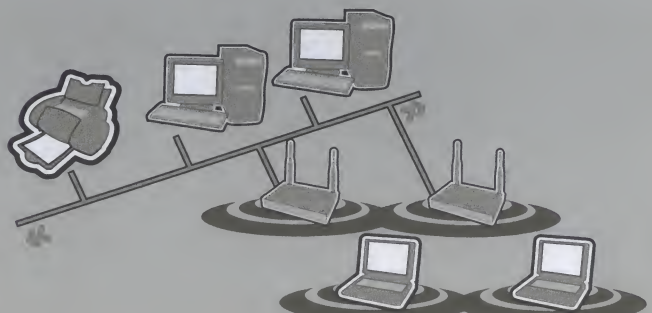
Many cities in the world are already intensely covered by Wi-Fi and local communities are abuzz with life (see *Taking over the airwaves*, *Atomic 19*). In the United States, Wi-Fi has become so prevalent that companies are selling their hourly- or session-based services that allow access to their established networks in major cities locally and internationally. You will find 802.11b everywhere you go, from hotel rooms to conference centres, airports to Starbucks.

Although it's not quite this red hot yet back in Australia, many communities are establishing wireless networks using homemade line of sight antennas that can communicate with each other up to 25km away. With the right people and management, it is not too far fetched to see a daisy chain linking access points in cities much like the prim towers in Red Alert!

Of the many technology breakthroughs happening each day, 802.11 offers something fresh. Instead of incremental improvements inside the box, it brings you new possibilities from the outside.

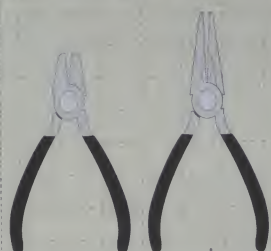
Even as you read this, new ideas are being worked on to improve traffic management, security and bandwidth, some of which can be updated through a firmware patch. Hardwire miniaturisation is also happening at an amazing pace, with adaptors that will fit in Secure Digital cards and other forms expected by the end of this year. The next generation of laptops using Intel's Banias chipset will have 802.11a/b dual band built into the chip's micro architecture.

Most exciting of all, Wi-Fi brings you closer to a larger community over the airwaves, which may end up stealing your life like the Internet did, and that is something few upgrades can do. The fantastic possibilities are limited only by our imagination now. □



ABOVE: In ad hoc mode, all Wi-Fi cards can communicate with each other independently. On the other hand, infrastructure mode requires an access point, which arbitrates all communication between Wi-Fi devices in its area with increased range and provide linkage to the wired network.

GEAR



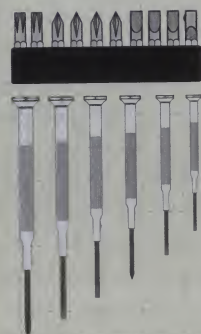
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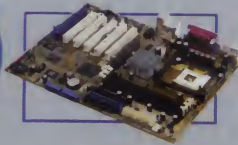
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Rendering reality

Pro 3D cards are expensive. Very expensive. With new contenders hitting the scene from NVIDIA and 3DLabs, it was time for Bennett Ring to examine which one offers you the most frames for your dollar.

Professional 3D cards are very different kettles of fish when compared to consumer-level 3D cards. Where the gaming-oriented cards can be likened to a standard rally car, the professional 3D cards are more akin to specialised hill climbers. In terms of hardware they're nearly identical, but a couple of tweaks to the hill climber gives it the ability to shine in the specialised hill climbing races. Consumer 3D cards and professional 3D cards have almost identical hardware, but the Pro 3D cards' specialised features allow them to leave their consumer competitors eating dust and gravel when rendering in OpenGL.

The primary difference between the two card types is at the driver level; in terms of pure hardware the difference is astoundingly minimal. We can't stress to you enough how important drivers are when it comes to Pro 3D cards. For example, on the day before this article was due to go to the printers, we received new beta drivers for the Wildcat. After a last minute retest of the Wildcat, we found that these led to an increase of around 400% in the Geometry 2 test in 3ds max 5, but also caused a performance decrease in every other test. These drivers also had absolutely zero support for dual monitors, so we decided to stick with the original drivers used for the tests. But it proves that if the drivers are optimised, phenomenal increases in performance can be obtained.

Considering the huge price difference between the consumer and professional cards (which are often double or triple the price), it's surprising there isn't much of a difference in the hardware used. We're sure that the specialised drivers probably cost a little more to develop due to the extra time involved in their creation, but not to the extent of these price hikes. Due to the nearly identical hardware used, it has been possible in the past to make minor modifications to consumer level cards, specifically the NVIDIA GeForce series, that allowed them to use the specialised drivers of their Pro 3D big brothers. If you're running one of the earlier GeForce2 cards you can still do so, using an application called SoftQuadro. GeForce3 owners will need to

do a touch of soldering to get the same result – a quick Google search will point you to many different tutorials on this procedure. Be warned: this can lead to a performance drop in standard gaming use, so only proceed with the modifications if the primary use of your video card is 3D rendering. The result of these hacks was a tweaked consumer card that performed almost as well as the Pro 3D model, in terms of both image quality and OpenGL rendering, at around half the cost or less of the Pro cards. However, NVIDIA has quashed these cost saving shenanigans, making it impossible to modify the GeForce4 into a Quadro due to hardware differences.

With the recent release of the Wildcat and Quadro cards, it was necessary to put these cards head to head. We also included the ATI FireGL 8800 video card, which is soon to be superseded by the new RADEON FireGL X1 card from ATI. We actually received an early engineering sample of the X1, but due to its very immature driver set its performance was sporadic at best. A full review of this card will appear in *Atomic* next month, but we can say that when this beast works properly, there will be no rival to its performance. Most of the cards in this roundup retail for around \$1,600, with the exception of the Quadro4 900XGL, which retails at approximately \$2,600.

To test these cards our usual testbench components simply weren't up to the task. Enter Xenon, www.xenon.com.au, who supplied us with a tower of power in the form of a dual 2.4GHz Xeon system with 1GB of PC800 RDRAM. Drool now.

Xenon was even kind enough to do a dual install of W2K and WinXP for us so we could test with the most relevant OS. We decided to use W2K with Service Pack 2 installed, as this is the OS most likely to be used in the real world with these cards.

Not the usual suspects

Benchmarking these cards required the use of very different tests to what you're accustomed to seeing within *Atomic*. After all, gaming is not high on the list of priorities for these cards, but OpenGL

performance in professional 3D rendering programs certainly is. We focused purely on the speed aspect of these cards for DCC (Digital Content Creation), commonly known as 'How quickly can I get this scene rendered before I can go home?' Image quality, such as dropped pixels and transparencies, are also important, but they're pretty much impossible to measure objectively.

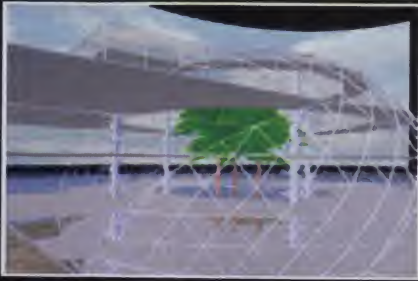
SPECviewperf V7.0 was chosen as the primary benchmark as it is widely accepted as being the best OpenGL benchmarking application for professional 3D cards, and incorporates six different application-based tests. You can find a description of each of these six tests to the right. As well as these tests, we also fired up some custom 3ds max benchmarks. Thanks to the new copy of 3ds max 5 we reviewed this month we were able to use the latest version of this incredibly popular 3D rendering application. Each video card was set to 3ds max optimisations when testing under this benchmark, with a focus on performance instead of quality.

Each scene was looped five times, and the time taken was manually timed with the trusty stopwatch. Each test was run three times to remove the human error inherent with using a stopwatch. The frame rate was then calculated by dividing the number of frames over the five loops by the total time.

Three scenes were looped in this manner, with view mode set to Smooth+Highlights:

1. geometry2 – found on the 3ds max 5 benchmark CD, this is a Martian landscape with zero textures, but large amounts of polygons and shading.
2. textured2 – also found on the benchmark CD, this scene stresses the texture performance of the cards.
3. House – created by our very own 3D wizard Ivon Smith from the Noggin team www.noggininloggin.com (it's a bit like *Atomic*, except it's for kids), this scene offers a nice mixture of polygon and texture performance.

The final test to be run was Mad Onion's 3DMark2001 SE, just to show you how woeful these cards are for 3D gaming. Or are they. . .?



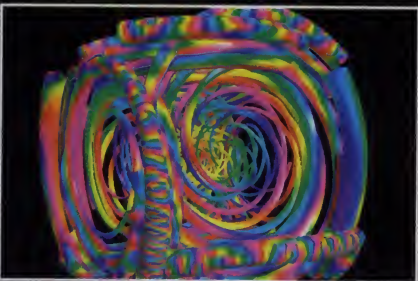
1. 3dsmax-01

This 3D Studio Max 3.1 benchmark uses Discreet's OpenGL plugin when tracing for 14 different scenes. Each model is measured using two different lighting models, ensuring the test reflects the use of a wider range of 3ds max users. These models come from the SPECapc 3ds max 3.1 benchmark. Weighting for these different tests was 1/3 smooth shaded, 1/3 facet shaded and 1/3 wireframe.



2. drv-08

This is based on the Design Review application, which was created specifically for the rendering of plant design models, which include piping, equipment and structural elements. Yes, *very* exciting indeed. The model used in this test is the GYDA offshore petroleum production platform located in the North Sea. Told you it was exciting. This model is used for five tests.



3. dx-07

This psychedelic model is rendered using IBM's Visualisation Data Explorer, an application designed for scientific data visualisation and analysis, available on Unix workstations from SGI, IBM, Sun and HP. The tests visualise a set of particle traces through a vector flow field. A total of ten different tests use the above model – unfortunately none of these involved Smurfs on acid.



4. light-05

Using Discreet Logic's Lightscape Visualisation System, this benchmark focuses on the performance of the card when using OpenGL displays of a simulation of a proprietary radiosity algorithm with a physically based lighting interface. Now that's a mouthful. Not only will it impress friends when you say what it does, it also happens to make it a great OpenGL test.



5. proe-01

PTC's Pro/ENGINEER 2001 forms the basis for this test. Five tests are included that use this application: two models and three rendering modes. The PTC World Car model used in the tests represents a large model workload, composed of 3.9 to 5.9 million vertices. The second model is comprised of 485,000 to 1.6 million vertices. A mix of shaded, hidden line removal and wireframe tests are performed.



6. ugs-01

Three rendering modes are tested in this benchmark: shaded, shaded with transparency, and wireframe, all within the Unigraphics V17 application. The engine model used in the test was taken from the SPECapc for Unigraphics benchmark. It is the only test that examines antialiased line performance, important to note for those who need their lines as accurate as possible.

The contenders

3Dlabs Wildcat VP870

Website: www.3dlabs.com

Supplier: InterCAD www.intercad.com.au

Phone: InterCAD (02) 9975 7133

Price: \$1,562

If you believe the marketing demons, the VPU (Visual Processing Unit) on this card contains the equivalent of 200 32-bit processors. Sure it does. What is more believable is the fact that this card was the first to offer a true 256-bit DDR memory interface, used for the 128MB of onboard DDR-RAM, which has now also been implemented on the Matrox Parhelia and the RADEON 9700 Pro. The VP870 is the middle card in the new Wildcat range, with the primary difference between the models being clock speed. Unfortunately 3Dlabs doesn't publish the clock speeds of the VPU or the memory, so we can't tell you just how much slower the VP870 is than the top of the line VP970.

One of the more impressive features of this video card is its full programmability throughout the entire graphics pipeline. This enables the card to deliver custom special effects, which are used extensively in game design and OpenGL applications. It also makes the card 100% compatible with the upcoming OpenGL 2.0 and D3DX APIs. Dual 10-bit 370MHz RAMDACs give this card exceptional image quality at the desktop, provided via one D-sub and one DVI out – unfortunately the controls for these seem to be the least configurable of the lot. A consumer-level (ie. gaming) card based on this chipset was due for release this year, but this now appears to have been relegated to the vapourware category.

Leadtek Quadro4 750XGL and 900XGL

Website: www.leadtek.com.tw

Supplier: BCN Tech www.bcn-tech.com.au

Phone: BCN Tech (02) 9648 0888

Price: 750XGL = \$1,795; 900XGL = \$2,640

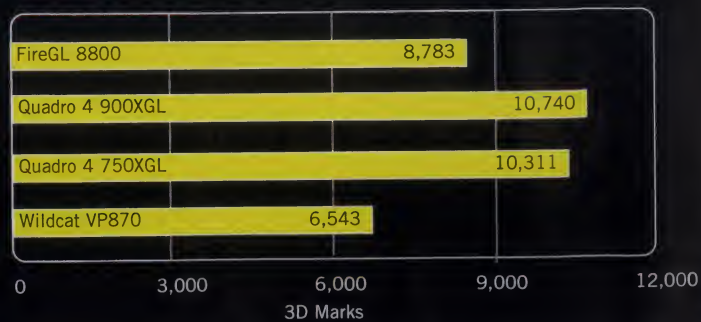
Both of these cards are based on NVIDIA's popular GeForce4 GPU, also known as the NV25. The only difference between the 750 and the 900, other than a grand or so of your hard rendered cash, is in the speed of the memory and GPU. The 750XGL core clocks in at 275MHz, which is only marginally slower than the 300MHz core within the 900XGL. The memory of the 750XGL is also only slightly slower than that of the 900XGL, at 550MHz compared to 650MHz.

These cards are very similar to the GeForce4 consumer cards at the hardware level at the least, with nearly identical components. The major hardware differences between the Quadro and GeForce are: hardware antialiased lines; hardware overlay planes; and finally a hardware XOR engine, all of which lead to a performance increase. A 400MHz RAMDAC provides a display that is just as crisp and clear as the other cards in this H2H, which is traditionally an area

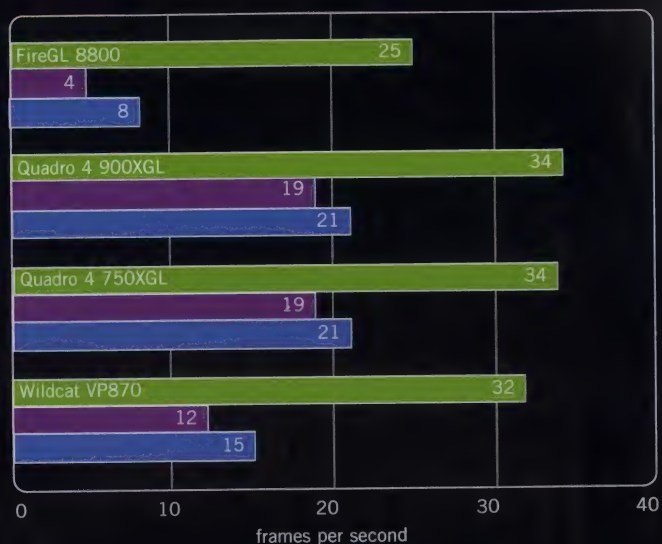
SPECviewperf V7.0



3DMark2001 SE



3ds max5



Challenge
Surprise
Amaze
Recognise
Complement
Inspire

AMD
me.

NVIDIA hasn't excelled at. The 750XGL ships with one D-Sub and one DVI output, while the 900XGL has two DVI outputs and no D-Sub. An adaptor is included with the 900XGL in case you haven't made the move to digital displays. Cheapskate. The nView monitor configuration software stands out as being highly configurable, yet simple to use.

ATI FireGL 8800

Website: www.ati.com

Supplier: Xenon www.xenon.com.au

Phone: Xenon (03) 9763 2777

Price: \$1,445

Just like the Quadro4, the FireGL 8800 is based on a consumer level video card, in this case the RADEON 8500. According to ATI it uses a RADEON 8800 GPU, which is just the R200 from the 8500 at a slightly higher speed. 128MB of onboard DDR-RAM is provided, running at a speed of 300MHz (effectively 600MHz), while the GPU is clocked synchronously at 300MHz. Dual monitor support is provided via one D-Sub and one DVI output, both of which are controlled by the highly acclaimed Hydravision interface.

Renderfest '02 results

All benchmarks were run with the desktop set to a resolution of 1,280 x 1,024, at a colour depth of 32-bit, being the most commonly used setting on graphics workstations.

The first test to be run was the suite of benchmarks that make up SPECviewperf V7.0. As the graphs show, the Quadro 4 cards dominated this set of tests. Surprisingly, the largest difference between the Quadro 4 750XGL and 900XGL was a single frame. When we consider the large additional cost of the 900XGL, the 750XGL looks like a great buy.

The Wildcat managed to surpass the Quadro 4s in a single SPECviewperf test, the dx-07 test, which looks at the performance under IBM's Visualisation Data Explorer. Unfortunately this application is nowhere near as popular as many of the others contained within the SPEC suite. It must be said that the Wildcat drivers were flaky at best – we had to test with several different versions before we found the highest performing set, which was actually a beta set. Unfortunately for ATI the FireGL finished last, and usually by a large margin, especially when compared to the Quadro results. Don't expect ATI to remain in last place for long though, as the upcoming X1 looks set to dominate. The second set of benchmarks were the looping 3ds max5 tests. Again the Quadro came out as the leader of this motley crew, especially in the geometric tests. The FireGL trailed far behind the rest, but its performance was so poor that we believe it's a driver issue, due to the latest FireGL drivers being released in June 2002, months before version 5 of 3ds max.

The final test was Mad Onion's 3DMark2001 SE, just to show how shoddy these cards are for running games. Well, that's what we intended, but the results weren't quite what we expected. The Wildcat benchmarked woefully for a \$1,500 card, scoring just over 6,500 3DMarks, which is even more pathetic when we remember that this is being run on a dual Xeon system with a gig of RD-RAM. However, the cards based on consumer level graphics cards did surprisingly well, with the Quados both clocking over 10,000 3DMarks, and the FireGL not far behind. If you happen to be on the lookout for a 3D card that's great for those lunchtime LANs, it's time to convince your section manager just how fast the Quadro card is when rendering the new company logo.

There can only be one


It's quite clear that the Quadro 750XGL is the card to have if you're after a speedy OpenGL workhorse. While it's not quite as fast as the 900XGL, the miniscule performance increase offered by the 900XGL isn't worth the extra thousand dollars.

We were expecting great things from the Wildcat VP870, but sadly its relatively poor benchmark results show that this card simply can't live up to the huge amount of hype behind it. Driver revisions should help its cause in the future, but until then it's not a viable option.

Our results aren't surprising when you consider Pro 3D performance is all about the quality of the drivers behind the hardware. NVIDIA has established an excellent reputation for producing high quality drivers, unlike ATI who is renowned for having serious driver problems. And being such a new piece of hardware, it's going to take some time before the 3Dlabs engineers reach the full potential of the Wildcat's hardware via drivers. It's quite possible that given new drivers the VP870 could be a field leader, but as it stands it doesn't even come close.

While we've given the Quadro 750XGL the current champion of OpenGL rendering award, our preliminary results from the RADEON 9700-based FireGL X1 suggest that there is a new contender waiting in the wings, ready to wipe the floor with anything NVIDIA can throw its way. We'll have full benchmark results from this beast in next month's *Atomic*.

Thankyou!

A massive shout out to Ivon Smith, our resident 3D guru, for pointing us in the right direction in this jargon-infested 3D jungle. 



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OptusNet and Telstra — broadband gaming servers

Loitering all over the Internet are mysterious entities known as games servers feeding our need to offload stress, hormones and creative language at any time of the day or night. John Gillooly takes a break from a long spawn camping session to take a look at what drives our online gaming experience.

A lot of us have lost time gaming online. Around *Atomic* HQ we are scared to even tally up the collective man hours spent loitering on one server or another. 24 hours a day, seven days a week, people duke it out on servers all over the world. But the servers themselves are nefarious entities, run from machines that tirelessly process the packets and link the press of a trigger with the thump of a bullet hitting the amour of someone who may be thousands of kilometers away.

Whole communities spring up around these online hangouts. People who would never come into contact with one another bond at 3am while taking a break from the run-and-gun, trying stupid stuff, like building towers or pushing a games physics engine to its limits. We know countless good friends who would never have met if they hadn't first sighted each other down the scope of an MP5, or captured a flag.

While the tireless reign of Counter-Strike continues, some refreshing new titles have been capturing the hearts and minds of gamers. Of these, perhaps the two standouts are Unreal Tournament 2003 and Battlefield 1942, both generating a buzz that hasn't been seen for a long while.

But what of the hardware and software that drives the scene? After all, game servers aren't sentient beings that crawl onto the Internet and set themselves up for our enjoyment (although after sitting through a refresh of the server list for Counter-Strike you would think so). The vast majority of servers are run by ISPs, predominantly for their customers, but also for others out there on the Net.

Waiting to respawn in Battlefield 1942, after being on the wrong end of one of Bennett's artillery barrages, the thought arose again. Why do these game servers even exist for our enjoyment? It must be more than just to make us gamers feel happy, and more to the point, what lies behind the pretty visuals that we see? Is it just the battered beige box under the game admin's desk or does it resemble the sexy dual processor rackmount beasts that are all the rage nowadays?

To sate our now rampant curiosity we decided to go to the source and check out the gaming services of Australia's two biggest broadband ISPs: Telstra and OptusNet. We went and checked out the racks that house the games servers in OptusNet's Sydney facility, where we were responsible for OptusNet's Quake 3 servers suffering some unplanned downtime while we opened up one of the servers to check out the guts. The 14 Optus servers are predominantly dual CPU rack mount units.

Telstra's racks of gaming fun, on the other hand, are located in Melbourne, with the administration handled from Brisbane. There are around 60 physical servers, with the average specifications being dual 1GHz CPUs with 512MB RAM and IDE RAID sitting on a 100Mb vault direct to the Telstra backbone.

Our investigations found two very different approaches to online gaming. Telstra, through its GameArena (<http://games.telstra.com/gamearena>) section focuses strongly upon the community aspect of the gaming, thanks in part to the legacy of the long running Wireplay games network on which it is based, especially through its new COGS server browser system, which integrates IRC based chat with a server browser that has been developed in house. Optus on the other hand, focuses upon the servers themselves, with a smaller

community system hiding on the internal network available for OptusNet users but with plans on the way to expand the games' presence on the www.optusnet.com.au Website.

In order to get a clear picture of just what it takes to run a large online gaming network, and also to see what is in store for us gamers in the future as online gaming continues to build as a source of entertainment, we hunted down and captured the two people responsible for running these gaming networks: Adam 'Term' Williams from Telstra GameArena and Nathan 'King Kermit' Clarke from OptusNet. After tying them to chairs, we warmed up the spotlight and quizzed them on the resources they have, what their network encompasses and what it takes to drive an online game from mediocrity to success.

FIRSTLY, WHAT ROLE DO YOU HAVE AND WHAT SORT OF BACKGROUND DO YOU COME FROM?

Nathan (OptusNet): My title is Interactive Engineer, although most people know me as the Games Master. My main role is to look after all the OptusNet game servers. I was first involved with the Multiplayer Games service when it was first built November 1999. A few months later I had a full time job as Games Master, later on I moved into the Systems Management team. And yes, I do believe I have the best job in the world.

Adam: Produce GameArena. I'm from a Software Development background.

HOW MANY STAFF ARE DEDICATED TO THE GAMING AREA?

Nathan (OptusNet): The resources that we have are made up of volunteer administrators and some dedicated people. We are primarily focused on maintaining low levels of resources and high levels of automation.

Adam (Telstra GameArena): five staff:

Adam 'Term' Williams – Product Manager

David 'Trog' Harrison – Content Manager

Nathan 'Nats' O'Sullivan – Lead Programmer

Jason 'Jim' Brooke – System Administration, Programmer

Alex 'Cold' Puskul – Support, HTML programming

HOW MANY GAME SERVERS (BOTH HARDWARE AND SOFTWARE) DO YOU RUN IN TOTAL, AND HOW MANY DIFFERENT GAMES DO YOU SUPPORT?

Nathan (Optus Net): In total we have 14 physical servers (two of these are community servers). We have 66 game servers over 12 different software titles and 24 different game types, currently offering over 1000 simultaneous connections

Adam (Telstra GameArena): 103 game servers, including GameCreate, and the GameArena Ladders across a number of boxes.

WHAT HARDWARE AND SOFTWARE PLATFORMS DO YOUR SERVERS USE, AND WHICH GAMES DO THE DIFFERENT SERVERS RUN?

Nathan (OptusNet): Both Linux and Windows are used, but predominantly Linux. We're operating system agnostic as not all games have Linux binaries. The servers themselves are Dual Pentium IIIs running up to a 1GHz.

Adam (Telstra GameArena) Linux and Windows 2000. We tend to split



ABOVE OptusNet's Quake3 server



ABOVE OptusNet's servers comprise both ATX...



ABOVE ...And rackmount servers

game types 50/50 across servers. Some games run better on Windows, or can only run on Windows. Some games run very well on Linux so we'll tend to use it where we can for those games. Our preference is to use Linux where we can, as it is generally more efficient and we don't have the high operating system overheads on the system itself that is common with Windows products, leaving more CPU and memory for games!

HOW MUCH BANDWIDTH DOES EACH GAME USE ON AVERAGE?

Nathan (OptusNet): Games use surprisingly little bandwidth. On average, each connection usually sits at about 28.8Kb/s. That means each 20-player server uses around 576Kb/s.

Adam (Telstra GameArena): Bandwidth is based on rate, which can be set in most games, and is generally set to 10,000, which means 10,000 bytes per second transfer between each client and the server. Some newer games seem to be fixing rate to 25,000 or so, either due to lack of optimisations or to simply provide more information to the client – more player information, or more information about in-game objects.

Servers capped at 10,000 would use around 24MB per hour on the client, while servers capped at 25,000 would use around 50+MB per hour.

HOW MUCH BANDWIDTH DO YOUR SERVERS USE EVERY MONTH?

Adam (Telstra GameArena): This isn't something we want to publish.

WHAT ARE THE MOST POPULAR GAMES AND HOW HAS THIS CHANGED OVER TIME?

Nathan (OptusNet): The most popular is still Counter-Strike and it hasn't changed since early 2000 – the lifecycle of Half-Life is so long because of CS. Medal of Honor, Day of Defeat and Soldier of Fortune also rate highly.

Adam (Telstra GameArena): Well, Half-life is still a favourite, specifically Counter-Strike. We have over 3,000 gamers competing in the GameArena Ladders. One of the big new games is Battlefield 1942, which generally has around 250 people playing at any one time. Soldier of Fortune 2 is still a popular one, as is Medal of Honor: Allied Assault, and Day of Defeat. Lots of different factors affect what games are popular. Most of this though, is simply how fun the game is online – no matter what the developer does to a game, if it isn't fun to play, it won't get played. Additional factors can be things that gamers have a specific interest in. We're just coming out of an 'all things World War II' phase right now, with Battlefield 1942 probably dominating that theme, however Day of Defeat, the popular modification for Half-Life, has been very successful, as have other WWII-themed games such as Return to Castle Wolfenstein and Medal of Honor.

BESIDES TRADITIONAL DEDICATED-SERVER GAMING, HOW DOES YOUR SERVICE CATER FOR PEER-TO-PEER GAMES?

Nathan (OptusNet): We don't provide any game-matching software for peer-to-peer games but our customers can play peer-to-peer games on the OptusNet network. I'm also an OptusNet customer and I play a fair bit of Warcraft III online, and I've never had my connection to other OptusNet players drop out.

Adam (Telstra GameArena): We are currently rolling out a new client for gaming in Australia, called COGS (Complete Online Gaming System) that will be concentrating on making gaming as easy as possible for the Australian game player. This is the first client of its type that has ever been developed right here in Australia with a focus specifically on this market. The biggest issue for most gamers playing games online in Australia is latency. The country is so vast, so different states can make an impact on fast first person shooter games. Because we are so remote from the rest of the world, it means that playing games using systems like the Zone, or GameSpy Arcade means that if you get stuck playing with people from countries on the other side of the world it results in very slow and 'jittery' play caused by the latency between you and the other player. Using a system designed for Australian gamers means that players from other parts of Australia can more easily find each other and play, which will result in a better, more enjoyable game for the user.

The more 'fun' we make gaming, the more people enjoy playing, and talk to their friends about their experiences, which translates to more Australians getting into the fun and excitement of online games!

We're committed to doing everything we can throughout our development to making this a reality, and are a long way down the track already with the services we have put in place in GameArena.

ARE THE GAMERS ON YOUR NETWORK PRIMARILY CUSTOMERS OF YOUR NETWORK?

Nathan (OptusNet): No. We have a mix of OptusNet and non-OptusNet gamers using the game server, with a majority being OptusNet customers.

Adam (Telstra GameArena): Of course, we have lots of Telstra users, and we have some specific services that are created only for Telstra users on GameArena. Being a Telstra BigPond broadband customer gives you access to exclusive servers, and special download slots on one of the largest archives of game related files in Australia today. What's more, Telstra users play on and download from GameArena without it counting on their download cap. Telstra customers have a unique advantage in having access to our huge games service and still keeping their download limit for other things they may want to check out.

That said, we don't shy away from the rest of the community. And any other gamer can have access to GameArena, our servers, file archive, ladders, and forums.

WHAT IS THE RATIO OF BROADBAND TO DIAL-UP GAMERS ON YOUR NETWORK?

Nathan (OptusNet): The majority of gamers are broadband users of OptusNet Cable and other broadband ISPs.

Adam (Telstra GameArena): Most of the users on GameArena are on broadband. If not, it is normally due to the fact they simply can't get it in their current location. Broadband Internet is becoming an essential aspect of online gaming, as games become more complicated, and require more data between the server and the client – not to mention the size of patches and additional downloads which are frequently required to get everything working.



ABOVE: GameArena's new COGS game browser in action



ABOVE: King Kermit at work, overseeing the gaming antics on OptusNet

NOW THAT THE INITIAL PHASE OF EARLY ADOPTION OF BROADBAND BY GAMERS IS OVER, HOW IMPORTANT DO YOU SEE THE ROLE OF GAMING AS AN INCENTIVE FOR BROADBAND USAGE?

Nathan (OptusNet): I guess the growth of PC gamers using broadband has slowed, but it's still early days for broadband gaming. The ability to play online games is greatly enhanced when done over broadband.

WHAT OVERALL IMPORTANCE DOES YOUR NETWORK PLACE ON GAMING?

Nathan (OptusNet): We are committed to consistently providing a superior gaming service for our customers. There has been growing focus on the games network and if you're looking for a killer app to offer broadband customers you can't go past multiplayer gaming.

Adam (Telstra GameArena): The very existence of GameArena, as Australia's largest online gaming service, answers this question eloquently.

HOW ARE YOU ADDRESSING THE NEEDS OF GAMERS HAVING TO COPE WITH INCREASING AMOUNTS OF DATA TRAFFIC (35-50MB PER HOUR FOR BF1942) AS THEY TRY AND MANAGE THEIR BROADBAND CAPS?

Nathan (OptusNet): The My DataMonitor page provides an up-to-date measure for our customers of how much of their usage plan they have consumed. Even if you go over your usage limit you can still keep gaming, but at a slower speed.

DOES PLAYING ON YOUR SERVERS COUNT TOWARDS A CUSTOMER'S MONTHLY DATA USAGE?

Nathan (OptusNet): Yes

Adam (Telstra GameArena): Playing games on GameArena does not effect a Telstra Broadband customer's monthly data usage.

WHAT SERVICES DO YOU OFFER TO GAMERS ON YOUR NETWORK, IE. SERVER BOOKINGS AND COMPETITIONS?

Nathan (OptusNet): We're looking at building more features into our games product over time. What those are and when they'll happen is confidential at this stage.

Adam (Telstra GameArena): Providing services for gamers is what we are all about. We are the only service in Australia that uses its own custom client to allow connections to its servers and services. We have the only fully automated booking system for game servers in the country, which means players can book a server on GameArena and have the server start at their requested time with their requested settings, and they will have all the tools they need for the duration of that booking.

We are the only game service in the country to provide competitive play, all running off our own servers and all fully automated. Teams can challenge each other, accept challenges from other teams, and the server is booked on our network. Every member of each team will receive an email with the time, date, and other details of the server

booking, and once the time comes, our client software is updated with the details of the server so that the teams can join it easily. Additionally, some game types back this up with the creation of special spectating software, so teams can watch other teams play, to see how they perform for an upcoming challenge. This is done in Counter-Strike, Day of Defeat, Team Fortress Classic, and Return to Castle Wolfenstein. All these games have a spectator system integrated into the competitive ladder system.

We have some of the busiest game forums in the country, a huge file archive that's updated almost every day, seven days a week, where people can get the latest patches, demos and media quickly and as soon as they're available. Custom written statistics for most popular game types, complete with email tracker, (are available) so you can keep tabs on your friend's statistics via an automated mail delivery once a day.

To us, a game service isn't just about running game servers. Everyone can run game servers – it is about the services behind the servers, a place where you can play your games, and get to know the other people playing with you, and be part of a community of like-minded gamers. It also needs to be easy – gaming online is becoming increasingly complicated and through our developments we are trying to keep these complications away from the user as much as we can.

WHAT IS THE OFFICIAL POSITION ON PEOPLE RUNNING SERVERS FROM THEIR HOME CONNECTIONS?

Nathan (OptusNet): As stated in our Terms and Conditions you must not run network services or provide network services to others using the service.

Adam (Telstra GameArena): Broadband is limited by its capacity (bandwidth) to be effective at running today's dedicated server software. Added to that, it will actually cost the user for people to play on their locally hosted servers.

HOW ARE SERVER REQUIREMENTS CHANGING AS GAMES GET MORE COMPLEX AND MORE AND MORE DATA MOVES SERVER SIDE TO GET AROUND THE CHEATS THAT HAVE PLAGUED GAMES LIKE COUNTER-STRIKE?

Nathan (OptusNet): Newer games servers require faster CPUs and more memory, but this is just a natural progression, much like the need for gamers to update their systems in order to play the latest games. The move to server side cheat checking is essential as it makes developing cheats harder, and even harder for cheats to hide.

Adam (Telstra GameArena): The cheating that plagues Counter-Strike is largely a product of that specific engine. Little consistency checking and a host of other issues attributed to the ease of developing cheats on this engine. The approach of id Software, Activision and others, with the use of Punkbuster and other techniques, proves that making it difficult (while by no means impossible) can stem the flow of cheating online. Server requirements are not being increased considerably by anti-cheat

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measures, they are being increased by the increasing detail and complexity of today's online games. Anti-cheat systems are making server configuration somewhat more difficult, however we have systems in place to deal with this, and ensure that our servers are some of the most well configured servers in the country. Return to Castle Wolfenstein would be a good example of this.

HOW ARE YOU COMBATING CHEATING ONLINE?

Nathan (OptusNet): Where there is cheat protection we will implement it. Our customers are paying their hard earned money for the service and it is really disappointing that there are people who try and ruin other peoples' fun. We have a large number of volunteer game admins that help with banning of cheaters. We really appreciate the work these people put into OptusNet's games network and they do a great job catching cheats.

Adam (Telstra GameArena): To combat cheating we take a two-pronged approach. Firstly we have the GameArena GameOps, who have been so successful in providing a great place for people to play that many other game services are copying this format. GameOps are our front line of defence, and the team is made up of well-known members of the community in specific games. We arm them with some great tools and administrative features, which they use to control disruptive players, look out for, and remove cheats, as well as providing a whole host of other help and assistance to gamers on the service. Without the GameOps on a service as big as GameArena, there would probably be many more disruptive players.

Our second line of defence is our banning system. We have invested considerable hours of development time in our banning system to ensure that miscreants are dealt with as completely as possible. When a GameOp places a ban on a player, unlike most game services where it might only affect that specific server, on GameArena, any ban placed will take effect right across every game server of that type on our network within several minutes. This helps keep the service as free of cheats and troublemakers as possible within the limits of the software, and ensures the most fun for all.

HOW IMPORTANT DO YOU SEE THE ROLE OF DEDICATED SERVER SOFTWARE AND LINUX CLIENTS FOR A GAME'S LASTING APPEAL?

Nathan (OptusNet): We predominantly use Linux and we think it's very important that developers release Linux server binaries with the PC patches as well. The developers have realised this and it's not often that a PC patch is released without a Linux server patch. It's in the publisher's interest that the developer supports Linux as there has been a huge swing to Linux usage for running servers. If a developer asked me if it was essential to release Linux server binaries I'd scream 'Yes' because I have a lot more control over my operating system and how the game server is run. The most important feature of a dedicated server is if it's run from the command line or not. Graphical server interfaces are a nightmare. Linux clients aren't so much an issue because Linux hasn't really penetrated into the home user market. Linux clients are a nice-to-have and I don't think they have much impact on game sales.

Adam (Telstra GameArena): I don't think Linux clients are at all important for lasting appeal. Linux users use exactly the same hardware as Windows. There is no reason (other than cost) that they can't use Windows and take advantage of it. Of more concern would be Macintosh users, who don't have this luxury.

Linux users can also attempt to get the game running under Wine if they want to play in Linux. Every indication we've seen however is that DirectX and Windows is always faster than its Linux counterparts. Dedicated servers are different. For Australian users it is perhaps more important than for other countries, given that playing your game on GameArena doesn't effect your download limit, however playing on some US-based server both effects your download limit, and it's a slower game.

WHAT INFLUENCES YOUR DECISIONS ON WHAT GAMES TO SUPPORT AND HOW MUCH OF A CHANCE WILL YOU GIVE A NEW GAME BEFORE YOU DECIDE UPON CONTINUED SUPPORT?

Nathan (OptusNet): There are a few factors I look at. Number one being input from the community. If a fair number of my customers really want a game, chances are I'll be putting one up for them.

Demos also are a good indicator of how popular a game is going to be when it's released. It has to make business sense and I ask myself questions like is the server easy to run, can it be run on our network etc. Generally you have to keep your finger on the pulse and make sure you are satisfying as many people as you possibly can.

Adam (Telstra GameArena): Lots of factors influence our decisions, some of these include:

- How much is the community talking about a game?
- If there is a pre-release demo and how well is it doing on our services?
- How many resources does the game use?
- Do we have the resources available to support the game?
- Do we think the game is fun and viable as an online game?
- Is the game stable?
- Does the game have a dedicated server binary?
- Does the game require the CD in the tray?
- Is the dedicated server launched from within the game (OpenGL/Direct3D) or via a command line option?

HOW MUCH INTERACTION DO YOU HAVE WITH GAME PUBLISHERS AND DEVELOPERS?

Nathan (OptusNet): Apart from supporting and promoting their games online we have little interaction with them. Occasionally a developer will send us one of its games and we'll put it up for a trial and leave it if it gets played.

Adam (Telstra GameArena): We have a great relationship with most developers and publishers. Publishers like Activision have in the past supported some of our services such as the GameArena ladders etc. Most publishers are generally happy to act as conduits to assist us in discussing issues we have in specific software with the developers.

When attempting a close integration between the community for a game and the services you provide for it, you are generally pushing the limit of what the game can and can't do.

Sometimes our desire to do something will be greater than the ability of the software to cater to our needs. It is then that we need the publishers and developers alike to be onboard, and provide assistance, be it explanations on implementation of something, or a request for commands/features added to the game.

AS SOMEONE WITH A FINGER ON THE PULSE OF ONLINE GAMING, WHAT GAME DO YOU SEE AS BEING THE NEXT BIG THING? OR WILL WE BE STUCK IN THE COUNTER-STRIKE DOMINATED ENVIRONMENT FOR THE FORESEEABLE FUTURE?

Nathan (OptusNet): Counter-Strike will be around for some time, but I think Battlefield 1942 will do a bit of damage to its number one status. I think there will be a shift from the small team games like Counter-Strike to large-scale combat games like Battlefield 1942.

Battlefield 1942 looks like it's going to be huge, as we've had a really positive response from our demo server. Unreal Warfare looks like it could also fill this niche, and then of course we'll see a whole bunch of copycat games pop up.

Adam (Telstra GameArena): Battlefield 1942 could do well – it is a fun game, and lots of people are getting into it; however, high server overheads and insufficient features when compared to the Half-Life dedicated server or any Quake 3 engine game may relegate the game to a minority. At this stage it looks like it will be Counter-Strike for a while longer. Another interesting new game that we've had lots of success with so far is Unreal Tournament 2003, the sequel to the big sci-fi action original Unreal Tournament.

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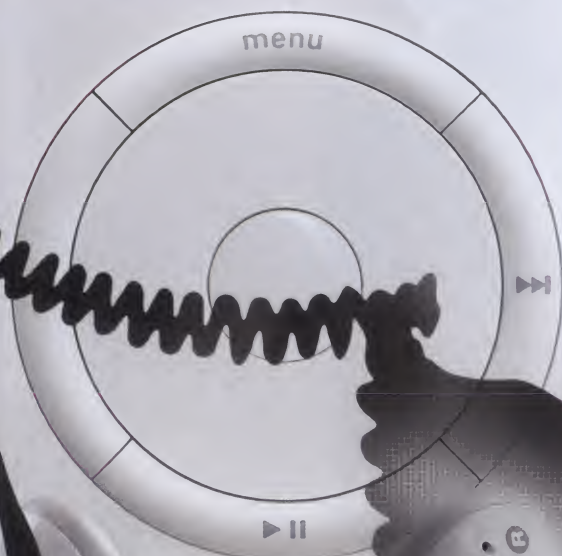
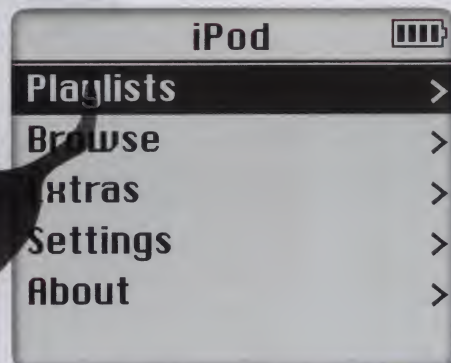
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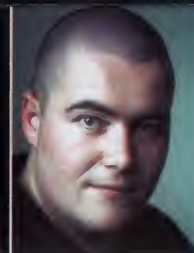
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REVIEWS

Hitting the nail on the head

AMD's next big thing has now officially slipped to next year and John Gillooly just keeps wondering why.



'Every time you see me The Hammer's just so hyped'. These words from Stanley Kirk Burrell, aka MC Hammer, that open the final verse of his timeless hit, *Can't Touch This* could easily be referring to the CPU that should rocket AMD even further into the stratosphere.

We've heard so much about AMD's x86-64 architecture, which goes under the Hammer codename: it is set to revolutionise the desktop by taking 64-bit computing out of the rarefied high-end enterprise sphere and into the home, years before the average user will want or need it. It is also AMD's chance to drive home the inroads it has made with the Athlon and continue to stick it to Intel in the battle for the performance crown.

Of course, that depends upon the CPU actually hitting the market. Recently AMD confirmed what had been suspected ever since Computex: that Hammer would not ship until the first quarter of next year. In the interim AMD is committed to the Athlon line up and up until the announcement it looked as though the new Barton core was drawing close. Barton is due to sport 512KB of L2 cache on a 0.13micron process, much like Intel's current Northwood core for the Pentium 4.

Unfortunately Barton seems to have been delayed as well, slipping from an estimated October release to a more hazy First Quarter of 2003, meaning that for the rest of this year, while Intel continues its rapid speed ramping and featuring adding to the Pentium 4, we will be stuck with the die-shrunk Palomino core that is the Thoroughbred for the Athlon.

The source of the problem has been hotly debated over the past month or two. There could be several reasons for a delay, but at the heart it seems to come down to the perilous 0.13-micron process. In order to make room for volume production of Hammer at the cutting edge Fab30 in Dresden, Germany, AMD has outsourced some

Athlon production to Taiwan's number two semiconductor manufacturer, UMC, and the reliability of its 0.13micron technology is still debatable.

Considering AMD itself has only just got 0.13micron working smoothly with the Athlon XP 2400+ and 2600+ chips (the first 2200+ Thoroughbred was plagued by heat problems) it is unsurprising that delays are happening with Barton and Hammer. The other issue is that most of Dresden spent weeks underwater for a large chunk of August. While this didn't directly impact Fab 30's operations thanks to some careful placement of the site on the high ground at the rim of the river valley, one has to assume that the flooding would have stressed human resources as employees sat patiently on the roofs of their houses waiting to grab hold of flotsam headed in the direction of Fab 30.

0.13 micron seems to be plaguing the industry. Two of the biggest hardware releases slated for release this year have slipped because of it, namely Hammer and the NV30 graphics chip from NVIDIA. So far the only company that seems to have 0.13 micron completely nailed is Intel, and it has been pumping out volumes of Northwood cored Pentium 4s for some time now. Intel has had a golden year, ramping the speed of its processors effortlessly and pulling away from AMD's Athlon in the performance stakes.

I would rather Hammer slips to early next year than AMD release a buggy rush job (the same goes for NV30). It is such a major jump in technology that it is imperative it is bug free and available in volume once launched. One of Intel's main strengths is that when it announces a CPU, there is volume ready for retail, but AMD has historically had a problem with combining CPU launches with actual stock. I still remember spending months searching for a retailer that actually had stock of Athlons when

they were first announced. In the end I grew sick of waiting and purchased a Pentium 3 – as I write this, the 2600+ and 2400+ Athlon XPs are still as rare as hens' teeth, almost a month after they were announced.

So what does the rest of the year have in store for us from AMD? The official line is that AMD is still evaluating the 333MHz FSB for the Athlon XP, support for which is already built into the KT400 and nForce2 chipsets, and realistically that is the only new thing we can expect to see.

What will be interesting is to see how AMD's PR ratings adapt to any change in Front Side Bus. We recently had the chance to chat with the man responsible for this scheme, AMD VP in charge of Consumer Advocacy, Patrick Moorehead, and the most he could comment on was that in the future higher performance CPUs would have higher PR ratings. Unofficially, it has come out that AMD has already altered the formula for PR ratings slightly over the past few months, actually dropping the ratio back a notch.

The real change will come when AMD adopts the new cores. For a year now it has enjoyed a fairly linear ramp with the Palomino and Thoroughbred cores, but Barton with its extra cache and Hammer with its radically different architecture mean that the formula will shift. Intel is now starting to suffer from a similar problem that AMD faced. Clock-for-clock both the enterprise level Itanium chip and the upcoming mobile Banias chip differ radically in performance to the Pentium 4.

But for now we wait for Hammer. Hoping and praying that it ends up delivering on the big promises made. It's a bitch about the delays, but hopefully it will mean that AMD can grab back the performance it has lost over the past months to Intel and deliver a CPU that gets the market back to the competitive paradise it used to be.

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The *Atomic* HOT award is given only to the most kickarse products to hit the labs, ones that score 9 or greater. The ones we'd want.

Here at *Atomic* it is our primary intention to give you the final word on the latest in hardware and PC technology. An integral part of determining the performance of a particular piece of hardware is benchmarking, and this is something that we take very seriously in the *Atomic* Labs.

SYSmark2002

SYSmark is a product of the collaboration between industry group BAPCo (www.bapco.com) and MadOnion.com (www.madonion.com). It is one of the next-generation application benchmarks and is designed to more accurately replicate the day-to-day workload that a system is subjected to. The benchmark focuses on Internet Content Creation and Office Productivity tasks in order to generate a final rating.

SiSoftware Sandra 2002 Professional

Sandra, from SiSoftware (www.sissoftware.co.uk), is a comprehensive benchmark and diagnostics utility. It contains dozens of special module applets that retrieve detailed information about the specifications and settings of a system, by polling each component's built-in firmware or BIOS. Sandra also features

a small suite of synthetic benchmarks for specific components such as CPU, memory, CD-ROM and hard disk. It also features a burn-in wizard for stress-testing overclocked systems.

3DMark2001SE Pro

3DMark2001SE Pro from MadOnion.com is the next progression of the popular benchmark utility. It also uses the MAX-FX engine and heavily emphasises DirectX 8.1 functions, including programmable shaders. The results are not comparable with results from 3DMark2000 Pro.

Serious Sam: SE

Serious Sam: The Second Encounter is used for testing OpenGL performance. For game tests we use the Cooperative demo, which outputs an average framerate trimmed of excessive peaks. It also contains a fillrate test, which outputs fillrates for various texturing methods and is useful for comparisons between video chipsets.

HSF testing

To test HSFs, we use our Athlon XP test bed, which uses an internal temperature diode. SiSoft Sandra 2002 is run in looping burn in mode, with both CPU tests selected for 30 minutes before the load temperature is

recorded. The CPU is then left to idle for 30 minutes before the idle temperature is taken.

Quake 3: Arena *AtomicMPC* Demo

Quake 3: Arena (Q3A), from id Software, is the very popular first person shooter representing widely used OpenGL gaming technology. Q3A has a built-in benchmarking utility and built-in demos that can test graphics card performance. These demos are fairly simplistic, and are not representative of the worst conditions that the game can offer to a graphics card. So we developed our own *AtomicMPC* Demo that pushes the hardware as far as possible.

Other benchmarks

Sometimes we need to break down the tests into more specific areas, such as hard disk performance, memory performance or a particular facet of 3D like T&L. For these specific purposes we can draw on a vast number of applications, games and dedicated benchmarks such as CD Speed 99, DisplayMate, Dronez, MDK2, or Adaptec ThreadMark. We also use a Lian Li temperature probe from Anyware (www.anyware.com.au) for tests that involve the measurement of temperatures, such as HD heatsinks. ○

Atomic testbench specs

Both systems are running Windows XP Professional with Service Pack 1, DirectX 8.1 and the latest chipset and video drivers.

- AMD Athlon XP 1800+ system – ASUS A7V266-E motherboard (supplied by CASSA: www.cassa.com.au)
- Intel Pentium 4 2GHz – ABIT BD7II-RAID motherboard (supplied by ABIT: www.abit.com.tw)

Common components

- Samsung 256MB PC2700 DDR RAM (supplied by CASSA)
- Samsung 256MB PC800 RDRAM (supplied by CASSA)
- Hercules Prophet II GTS 32MB (supplied by Guillemot: <http://au.hercules.com>)
- 20GB Ultra DMA/100 7,200rpm hard disk drive
- Hercules Prophet II GTS 32MB (Supplied by Guillemot: www.hercules.com)
- Sound Blaster Live! Player (Supplied by Creative Labs Australia: www.creaf.com)
- ASUS 52X CD-ROM (supplied by CASSA)
- Belkin PCI FireWire card (supplied by Belkin: www.belkin.com.au)
- Belkin PCI USB 2.0 card (supplied by Belkin)

Benchmark settings

3DMark2001SE Pro

- 1,024 x 768, 16-bit colour, 16-bit textures, 16-bit Z-buffer, triple frame buffer
- 1,024 x 768, 32-bit colour, 32-bit textures, 24-bit Z-buffer, triple frame buffer
- 1,600 x 1,200, 16-bit colour, 16-bit textures, 16-bit Z-buffer, triple frame buffer
- 1,600 x 1,200, 32-bit colour, 32-bit textures, 24-bit Z-buffer, triple frame buffer

Quake 3: Arena *AtomicMPC* Demo

All tests use Quake 3 1.27g and our custom Q3A demo recorded by the *Atomic* staff

- CPU testing: 320 x 240, maximum geometry detail, minimum graphics settings, high sound quality
- Graphics cards: Low quality = 1,024 x 768, normal quality graphics settings, sound disabled
- Medium = 1,280 x 1,024, maximum graphics settings, with all game sound disabled
- High = 1,600 x 1,200, maximum graphics settings, sound disabled

Support

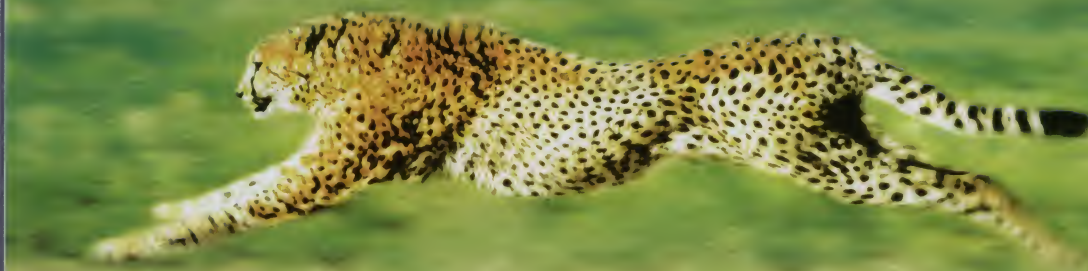
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X25350

Framerate

Speed freaks of the world unite, hardware just keeps getting faster and faster, and those video cards just keep getting cheaper and cheaper.

Video cards

Sparkle SP7200T6-PT/128M

Specifications: NVIDIA GeForce4 Ti4600;
128MB DDR RAM; TV Out; D-Sub
Core speed: 300MHz
Memory speed: 680MHz
Website: Sparkle www.sparkle.com.tw
Supplier: Australia IT www.australiait.com.au
Price: \$695



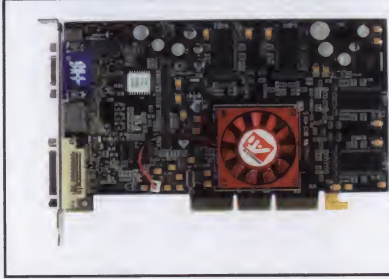
Albatron GeForce4 Ti4600

Specifications: NVIDIA GeForce4 Ti4600;
128MB DDR RAM; TV Out; D-Sub
Core speed: 300MHz
Memory speed: 650MHz
Website: Albatron www.albatron.com.tw
Supplier: QTD www.qtd.com.au
Price: \$599

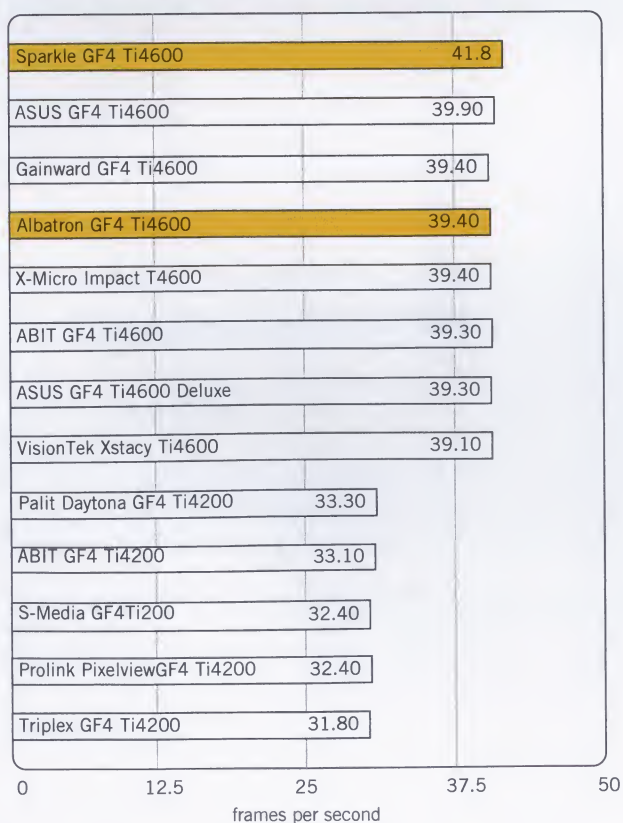


HIS Excalibur RADEON 9000 Pro

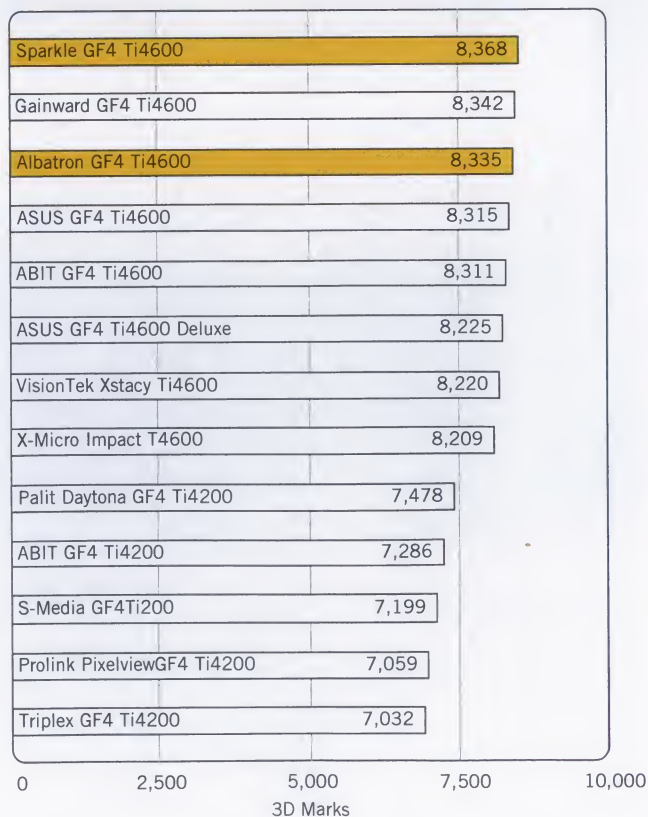
Specifications: ATI RADEON 9000 Pro; 64MB
DDR RAM; dual 400MHz RAMDACs
Core speed: 275MHz
Memory speed: 550MHz
Website: HIS www.hightech.com.hk
Supplier: AKA www.akatech.com.au
Price: \$275



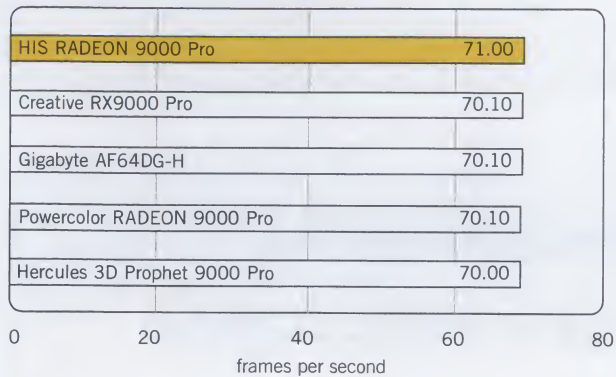
Serious Sam SE – 1,280 x 1,024 – quality



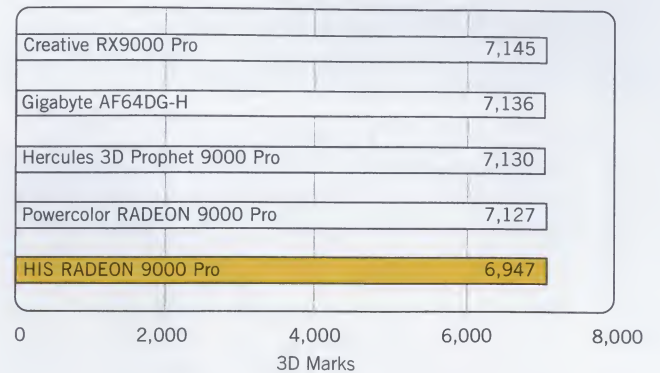
3DMark2001SE Pro – 1,280 x 1,024



Serious Sam SE – 1,024 x 768 – normal



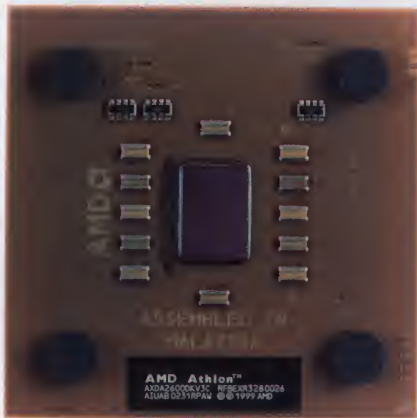
3DMark2001SE Pro – 1,024 x 768



CPUs

Athlon XP 2600+

Specifications: 0.13 micron process; 266MHz FSB; 128KB L1 cache; 256KB L2 cache. **Speed:** 2.133GHz **Website:** AMD www.amd.com

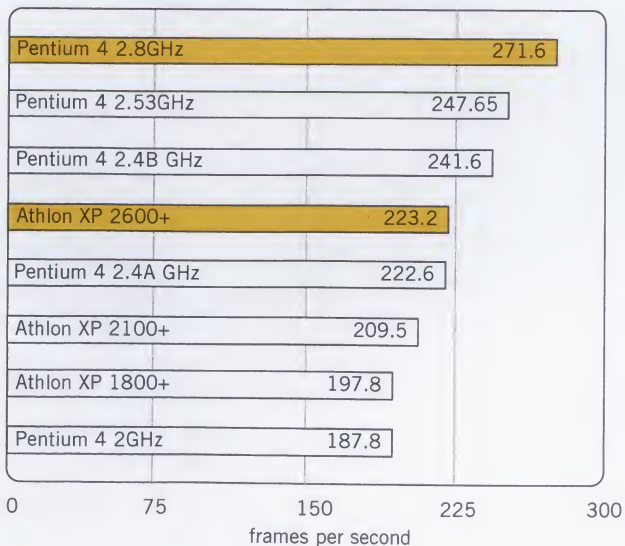


Pentium 4 2.8GHz

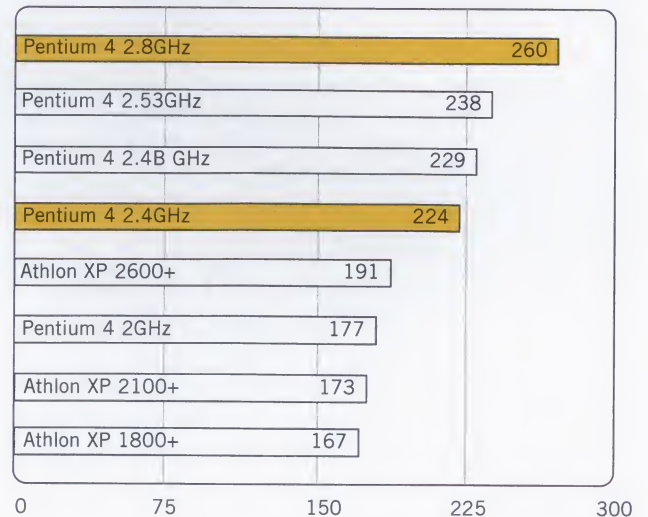
Specifications: 0.13 micron process; 533MHz FSB; 8KB L1 cache; 512KB L2 cache. **Speed:** 2.8GHz **Website:** Intel www.intel.com



Quake 3: Arena – CPU settings



SYSmark2002 – rating



Shuttle XPC SS51G



Shuttle has reinvented itself over the past year thanks to its innovative range of shoebox-sized Aluminium barebones systems. In the past, while these systems have been impressive, they have lacked two major features

that have prevented them from being seen as unbeatable solutions, namely support for the latest CPUs and reliance on integrated graphics.

The XPC SS51G changes this, adding support for 533FSB Pentium 4 CPUs thanks to a very funky heat pipe-based cooling solution known as ICE, and the motherboard now sports an AGP slot. And it still manages to compress all this into a shoebox-sized case. Considering that everything else you need, such as audio, LAN, USB 2.0 and IEEE1394, dwells onboard, the XPC SS51G has the potential to replace the hulking desktop beasts that we possess.

Unfortunately we found this unit still has heat problems: while the ICE cooling system does an admirable job cooling the CPU,

the placement of the AGP slot causes some significant concerns. Simply put, the video card's heatsink sits almost flush with the side panel, which is especially problematic with the NVIDIA reference heatsink that needs to be fed air from the top.

To test this we put some temperature probes into the system and ran it with and without a GeForce4 Ti4200 installed (we tried it with a RADEON 9700 PRO but it started overheating almost immediately). When the card was installed, internal temperature leapt to 40°C under load and crashed after about 20 minutes, yet when using the integrated graphics the system sat at a much less worrying 30°C.

This could be fixed fairly quickly by cutting a hole in the side of the case to feed fresh air straight to the video card, but it is definitely a concern. On the plus side, the system is bursting with features and is a great option for a home theatre PC.

The price is competitive with the purchase of a separate Aluminium case, power supply, motherboard and heatsink. Shuttle continues to do well, but heat management still needs more focus.

SPECIFICATIONS

Aluminium case; PSU; SiS651 Northbridge and SiS961L Southbridge; integrated graphics; one AGP and one PCI slot.

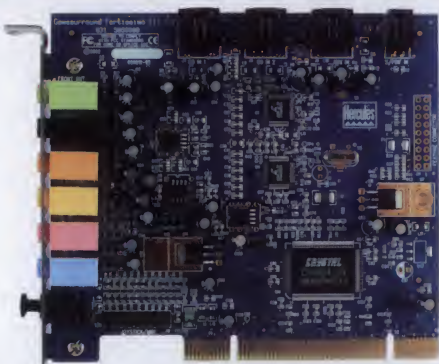
Website: Shuttle www.shuttle.com

Supplier: Sato www.satotech.com.au

Phone: Sato (03) 9899 6333 Price: \$748

8/10

Hercules Fortissimo III



The Hercules Fortissimo III is not much more than a Fortissimo II with the addition of an extra channel. But this extra channel can make quite an impact to your listening pleasure. A vanilla 5.1 sound card gives you front left, front

right, centre, rear left and rear right. The Fortissimo III, combined with a 7.1 speaker set, adds two back surround

channels through the use of Dolby Digital EX. Not too many DVDs support Dolby Digital EX, but fortunately *Star Wars, Episode 1* does. Actually, it was the first DVD to do so. Regardless, you are still going to need a set of 7.1 speakers to get the best this card has to offer.

The Fortissimo III is bundled with PowerDVD PRO EX, for watching DVDs with support for Dolby Digital EX; Acid Xpress, a music creation and editing application; and Hercules MediaStation II, a multimedia jukebox. This card also features support for Sensaura-based 3D positional; Microsoft Direct Sound 3D; EAX 1.0 and 2.0; A3D 1.0; I3DL2; MacroFX; MultiDrive; ZoomFX; and EnvironmentFX. Pleasingly, the card still

provides legacy support for older DOS games. A digital S/PDIF optical output is also present.

It's easy to get swept up in marketing blurb, particularly when it uses industry logos to declare compatibilities with particular standards. The Hercules Fortissimo III 7.1 carries the Dolby Digital EX logo, and in the card's technical specifications declares compatibility with Dolby Surround, Dolby Digital and Dolby Digital EX. Sounds impressive, but this compatibility has nothing to do with the card itself. The chipset is a Crystal (Cirrus) CS4624 – the same used on the Fortissimo II. This chip specifically does not decode or support Dolby Digital. Any Dolby sound you hear from the Fortissimo has been decoded by bundled software, namely PowerDVD, and pumped through the appropriate channels on the card.

None of that detracts from the overall sound output, and given this isn't a high-end sound card, it comfortably handles audio in both MP3 and CD format. DVD sound was impressive and audio quality in game environments was exceptional. The Fortissimo range of sound cards is always rich in features, and this model is worth considering, particularly for the price.

SPECIFICATIONS

20-bit quad output and 18-bit dual stereo input codec; DLS 1.0, General Midi and Yamaha XG compatible.

Website: Hercules <http://au.hercules.com>

Supplier: Guillemot Australia www.guillemot.com.au

Phone: Guillemot Australia (02) 8303 1818 Price: \$100

7/10

COOLJAG CPU COOLERS

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CPU Cooler JAC304C

Application: Socket 370, A / 462
Intel 1.4ghz, AMD XP2600+

Specification

Weight: 173 g
Dimension: 65 x 62 W x 32.7 H (mm)

DC FAN

Dimension: 60 L x 60 W x 10 H (mm)
Rated Voltage: 12 V DC
Speed: 5300 ± 10% RPM
Bearing System: One Ball Bearing
Safety Approvals (Standard): CE, AUL

Heatsink

Material: Copper C1020
Fin pitch: 1.3 (mm)
Fin thickness: 0.5 (mm)

Clip

Material: Steel SK7 / Nickel Plate



CPU Cooler JAC103C

Application: Socket 370, A / 462
Intel 1.4ghz, AMD XP2600+

Specification

Weight: 543 g
Dimension: 72.5 L x 62.4 W x 63.6 H (mm)

DC FAN

Dimension: 60 L x 60 W x 25 H (mm)
Rated Voltage: 12 V DC
Speed: 7000 ± 10% RPM
Bearing System: Two Ball Bearing
Safety Approvals (Standard): CE, AUL

Heatsink

Material: Copper C1020
Fin pitch: 1.2 (mm)
Fin thickness: 0.45 (mm)

Clip

Material: Steel SK7 / Nickel Plate



CPU Cooler JAC565C

Application: P4 Socket 478
Intel P4 2.4ghz

Specification

Weight: 600 g
Dimension: 89.5 L x 72 W x 55.5 H (mm)

DC FAN

Dimension: 70 L x 70 W x 25 H (mm)
Rated Voltage: 12 V DC
Speed: 6000 ± 10% RPM
Bearing System: One Ball Bearing
Safety Approvals (Standard): CE, AUL

Heatsink

Material: Copper C1020
Fin pitch: 1.7 (mm)
Fin thickness: ~0.5 (mm)

Clip

Refer the drawing



CPU Cooler JAC313C

Application: Socket 370, A / 462
Intel 1.4ghz, AMD XP1900+

Specification

Weight: 252 g
Dimension: 62.4 L x 62 W x 25.3 H (mm)

DC FAN

Dimension: 60 L x 60 W x 10 H (mm)
Rated Voltage: 12 V DC
Speed: 5300 ± 10% RPM
Bearing System: One Ball Bearing
Safety Approvals (Standard): CE, AUL

Heatsink

Material: Copper C1020
Fin pitch: 1.3 (mm)
Fin thickness: ~0.5 (mm)

Clip

Material: Steel SK7 / Nickel Plate

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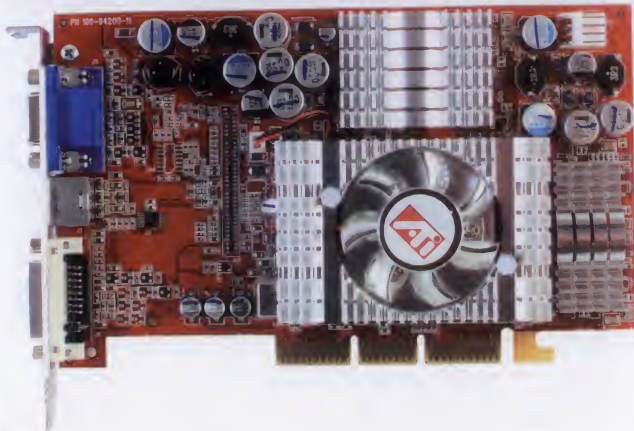
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Powercolor Evil Commando 2 RADEON 9700 Pro

The RADEON 9700 Pro is fast. Bennett Ring made it even faster.



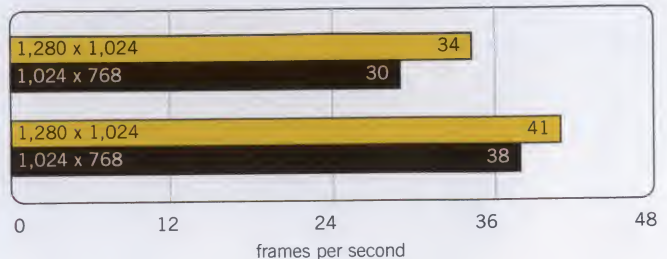
In last month's *Atomic* we presented irrefutable evidence that the new RADEON 9700 chipset is the fastest video chipset available for the performance-hungry, frame rate whore nestled deep within your subconscious. Due to the amazing performance we encountered with this new chip we couldn't help but focus on benchmarks to prove to you just how much this card whips the GeForce4 Ti4600's buttocks. This time around we thought we'd show you a few of the goodies this chipset brings to the table, as well as see how high it can fly when the overclocking gun is pressed to its head. But instead of using the Gigabyte model we saw last month, this time around it's the Powercolor model.

One of the cooler features of the RADEON 8500 was the TRUFORM function: it basically increased the number of triangles used to render a scene, resulting in increased detail and more importantly rounder curves, lending scenes a more organic look. The RADEON 9700 has a new version of this, creatively titled TRUFORM 2.0, which has several improvements over the original. Firstly, it now supports continuous tessellation, which means that the transition between different levels of tessellation (increased triangles) is smoother. TRUFORM 2.0 also supports adaptive tessellation: the closer an object appears on the Z-buffer, the more detail it is imbued with. Like the original TRUFORM, version 2.0 is supported by many existing games. Finally, TRUFORM 2.0 also supports the feature Matrox harped on about with its Parhelia: displacement mapping. For a detailed explanation of this feature refer to our earlier Parhelia preview, but all you need to know right now is that there isn't a single game available that makes use of this interesting feature.

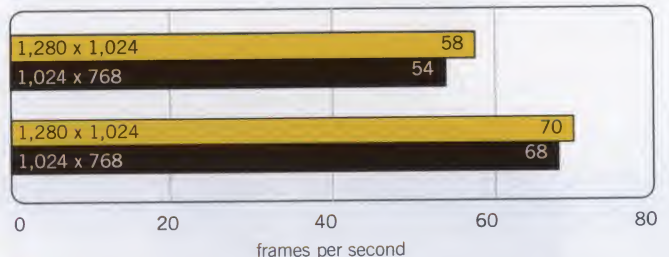
The RADEON 8500 had a serious issue with anisotropic filtering combined with tri-linear filtering – it simply couldn't do it. This was a major blow, as the performance hit with ATI's anisotropic technique was minimal, making gamers want to use it, but many were unwilling to do so if they had to use bi-linear filtering. This has now been rectified and, combined with this video card's screaming high performance, ensures that owners of the RADEON 9700 would be foolish not to run with anisotropic filtering enabled. Like its smaller sibling the RADEON 9000, the 9700 Pro includes ATI's FULLSTREAM technology. This is a pixel shader program implemented on video streams, with the end result being movies that are much less blocky, but also much more blurred.

We didn't get a chance to overclock the Gigabyte RADEON

Code Creatures



Serious Sam SE



Overclocked Default

9700 last month, but we read some very promising results on several online hardware sites. Then we realised that most of these results were from engineering samples, which usually use higher quality chips than those you'll find on the final retail version. So you can understand why we were keen to see how the retail Powercolor card overclocked. Unfortunately the results weren't quite as impressive as those we'd seen online: we managed to push the core up from its default of 325MHz to 360MHz – an increase of 11%. It's hardly spectacular, but then again, not too bad an effort from such a complicated hunk of silicon. Next up was the memory, which struggled to reach 345MHz (effectively 690MHz) from the default speed of 310MHz (effectively 620MHz). This 10% overclock didn't translate into a 10% increase across the benchmarks, but we did notice an improvement of 10% or so in the taxing Code Creatures.

The Powercolor board didn't exhibit any wondrous features that aren't going to be found on any of the other RADEON 9700 Pro video cards soon to hit store shelves – in fact, it's identical to the Gigabyte card we saw, right down to the serial number on the PCB. Having said that, there is one small caveat to that last comment that will have you reaching for your wallet straight after reading the next sentence. At \$845, this card shatters Ye Olde 'new high end card must be over a grand' rule. For this reason alone, [although the astronomical performance does help] we're pleased to give this card our prestigious Hot Award.

SPECIFICATIONS

128MB DDR-RAM; fully DirectX 9-compliant; ATI R300 chipset.

Website: Powercolor www.powercolor.com.tw

Supplier: Australia IT www.australiait.com.au

Phone: Australia IT (03) 9543 5855 Price: \$845

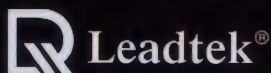
9/10

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Cooling System
with
Anti-Dust filter
design**



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- ★ Fill rate at an incredible 4.8 billion AA samples/sec



WinFast A250 Ultra TD

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- 128MB DDR Memory



WinFast A250 TD

- NVIDIA GeForce4 Ti 4400 GPU
- 128MB DDR Memory



WinFast A170 DDR TH

- NVIDIA GeForce4 MX 440 GPU
- 64MB DDR Memory

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51 Hill Road
Homebush Bay
NSW 2140

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41 Brady Street
South Melbourne
VIC 3205

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SPECIFICATION:

- > Intel® Pentium® 4 Processor 2.53GHz
- > Albatron PX845E Pro II Pentium® 4 DDR Motherboard
- > 512MB DDR400 Kingmax TinyBGA Ram
- > Albatron GeForce4 Ti 4600 128MB DDR
- > 2X60GB ATA133 HDD (Total 120GB in RAID 0 Mode)
- > 16X DVDRom
- > 48x40x12x CDRW
- > Logitech Freedom Pro Keyboard & Mouse
- > Creative Audigy D.E
- > Creative Inspire DTT5700 Speakers
- > Sony 19" CPD-G420 Monitor
- > Microsoft® Windows® XP Professional

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HgF

SPECIFICATION:

- > Intel® Mobile Pentium® 4 Processor 2.0GHz
With Intel SpeedStep Technology
 - > 1GB DDR SDRam
 - > ATI 64MB DDR M7-D Radeon 7500 3D Graphics
 - > 40GB Ultra ATA HDD
 - > 4X USB and 1X IEEE1394 Firewire Port Built In
 - > 56K Internal Modem and Fast 10/100 Ethernet Network
 - > DVD/CDRW Combo Drive (8xDVD, 8x4x24 CDRW)
 - > Front Panel Audio DJ with separate power switch
 - > 15" SXGA TFT Display
 - > Microsoft® Office XP Professional
 - > Microsoft® Windows® XP Professional
- Dimension: 330 (W) x 289 (D) x 43 (H) mm
Weight: 3.2 Kg (without Battery)

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Powerpoint 2002

www.microsoft.com/office

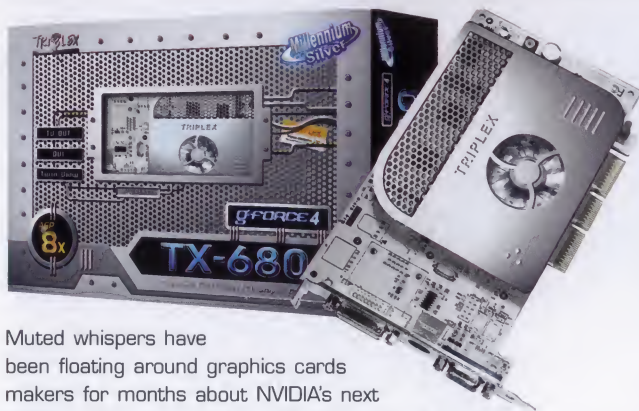
Publisher 2002

Outlook 2002

Access 2002

Triplex TX-680

Like NVIDIA, John Gillyooly enjoys a refreshing change every now and then.



Muted whispers have been floating around graphics card makers for months about NVIDIA's next refresh of its current lineup of chipsets. Two mysterious codenames have accompanied this talk: NV18 and NV28. The veil has lifted to officially reveal the longest video chipset names yet – NV18 is now officially the 'NVIDIA GeForce4™ MX 440 GPU with AGP 8x' and NV28 is now the 'NVIDIA GeForce4™ Ti4200 GPU with AGP 8x'.

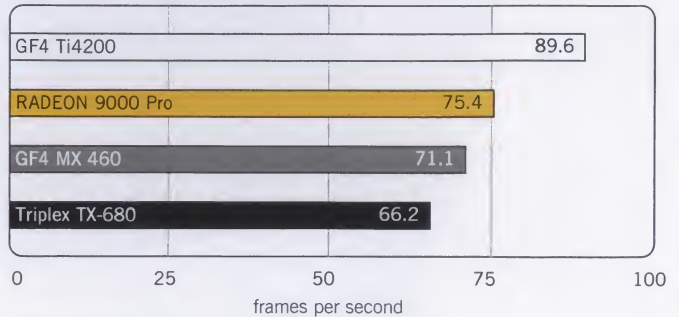
Basically these are both refreshes of the existing product lineup, with added support for the AGP 3.0 standard, which introduces a couple of new features, most notably the higher bandwidth AGP 8x speed and isochronous data transport. Apart from this addition, the GeForce4 MX 44 GPU with AGP 8x that powers Triplex's TX-680 card has two major additions: BGA RAM (the old MX440 used TSOP packaging) and higher clock speeds than the original MX 440. Where the original MX 440 sported a 275MHz core speed and 400MHz RAM, the Triplex TX-680 has a core speed of 300MHz and a RAM speed of 513MHz. These changes move the card into the niche previously occupied by the now discontinued GeForce4 MX460.

These boosted core speeds are welcome, but the big worry about the chipset is that it still lacks the Pixel and Vertex Shaders needed for DirectX 8 compliance. This has become even more of a drawback with the release of the RADEON 9000 Pro from ATI and the Xabre400 from SiS into the budget arena since the original launch of the GeForce4 MX lineup, and for slightly more cash you can pick up a GeForce4 Ti4200 card, which is still the standout choice in the price/performance stakes.

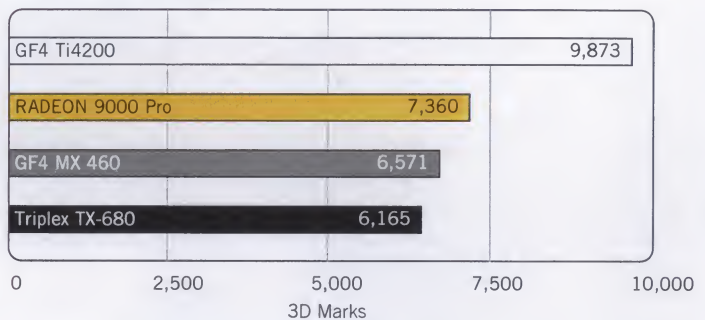
To get a grip on how the Triplex TX-680 performed, we lined it up against the GeForce4 MX460, GeForce4 Ti4200 and the RADEON 9000 Pro. We tested with 3DMark2001 SE Pro, Serious Sam SE and the newly released Unreal Tournament 2003 (UT2003) demo in which we have used the dm-antalus botmatch results. Our testbench was a Gigabyte 7VXP motherboard, which uses the AGP 3.0 supporting VIA KT400 chipset. For the NVIDIA cards we used the beta 40.41 detonator drivers and for the RADEON 9000 Pro we used the Catalyst 2.3 drivers.

As expected, the GeForce4 Ti4200 stands head and shoulders above the rest of the crowd, with the real competition coming down to the other three cards. In UT2003 the Triplex TX-680 performs at the same level as the GF4 MX460 and the RADEON 9000 Pro, however the TX-680 seemed to have major problems with Z-buffering, leading to visual artefacts in the benchmark. The source of this is unknown as it happened with both the beta 40.41 drivers and the previous official 30.82 version and most likely seems to be due to a bug in the demo code.

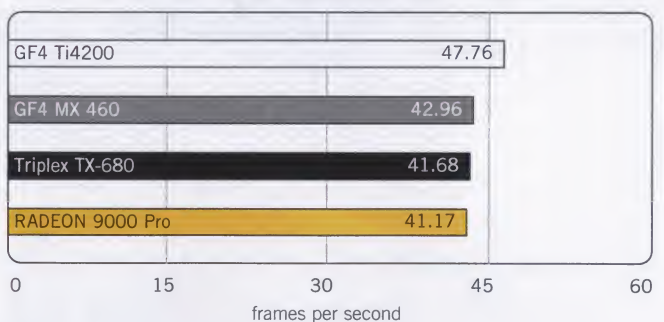
Serious Sam SE – 1,024 x 768



3DMark2001 SE Pro



UT2003 demo – dm-antalus botmatch



In the other benchmarks, the TX-680 falls behind the other cards, with the RADEON 9000 Pro shining.

Triplex's TX 680 is a good performer for the price, plus the Triplex Silver PCB is still one of the best lookers on the market, however the GeForce4 Ti4200 is still the most outstanding card when it comes to price/performance. For the cheaper cards, the RADEON 9000 Pro combines both DirectX 8 compliance and great performance into a package that puts the GeForce4 MX 440 with AGP 8x to shame, even at AGP 4x speeds.

SPECIFICATIONS

NVIDIA GeForce4 MX440 with AGP 8x; 300MHz core; 513MHz RAM; TV-Out and D-Sub.

Website: Triplex www.triplex.com.tw

Supplier: Oxygen www.oxygen.net.au

Phone: Oxygen (02) 9649 4477 Price: \$240



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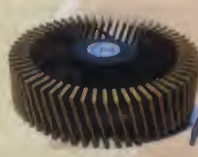
SLOT 1 GOLDEN ORB

Slot 1- Intel™ SECC II
up to 1.13 GHz



SLOT A GOLDEN ORB

Slot A- AMD K7 Athlon™
Slot A up to 1 GHz



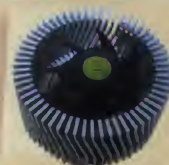
LOW PROFILE GOLDEN ORB

1U System Intel Socket 370



SUPER ORB

AMD™ SOCKET
462/A up to 1.5GHz



CHROME ORB

AMD™ ThunderBird
and all Duron processor™
up to 1.3GHz



MINI COPPER ORB

AMD™ ThunderBird and all
Duron processor™ up to 1.5GHz



DRAGON ORB 1

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DRAGON ORB 3

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up to 2.0GHz



VOLCANO 7

Qualified for
AMD AthlonX
P series up to
2000+ or
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370 & AMD
Socket 462



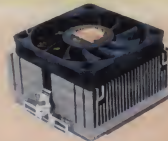
VOLCANO 7+

Application for
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XP 2600+ &
Intel 370 PIII or
application for
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478 upto 3.0 GHz



RACK MOUNT INTEL478 COOLER

for INTEL P4 478
PIN 1U Rack
Mount system up
to 2.0GHz

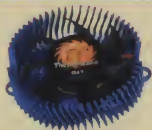


VOLCANO 8
APPLICATION
for AMD ATHLON
XP UP TO 2200+



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FEATURE

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BLUE ORB

Blue Orb For Chipset
Cooler GFORCE 2,3DFX



ORANGE ORB

VGA CHIPSET COOLER



CRYSTAL ORB

GeForce 2 Series, GeForce 3
Series, GeForce 4 MX Series
Video Card & Chipset



GEFORCE4 COPPER COOLER

NVIDIA GeForce4 Ti4200, Ti4400, Ti4600

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"U-Type" LCD
Temp. Monitor



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ALUMINUM "U-Type"
LCD Temp. Monitor
with Fan Speed
Setting Controller

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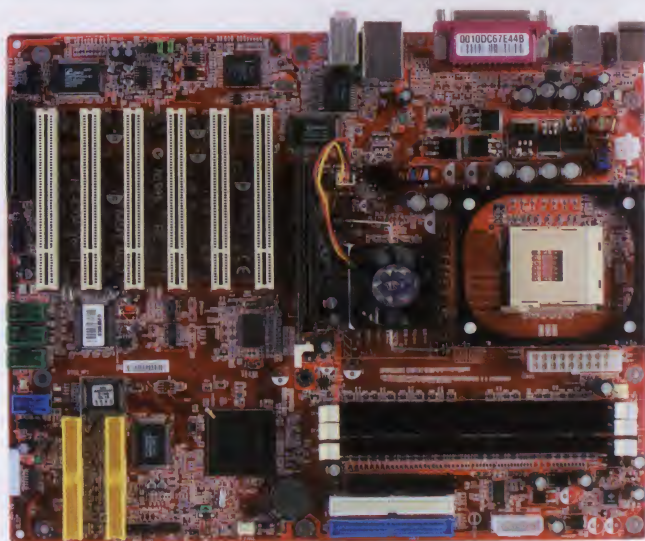
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MSI 845PE Max2

Intel's chipset lineup swells with PE-ness and John Gillyooly just chuckles.



Well folks, it's time for the quarterly update to Intel's 845 chipset for the Pentium 4. So far we have seen the i845, i845D, i845E, i845G and i845GL – now we have the i845PE and i845GE. The reason for these new variants is twofold: to officially add DDR333 support; and to prepare for the upcoming appearance of 3.06GHz and above Hyperthreaded Pentium 4 CPUs, which need both BIOS support for the Hyperthreading technology and more power supplied to them than earlier boards can give.

The support for faster DDR is welcome, but as we saw in our Pentium 4 motherboard roundup in *Atomic 21*, some boards that use i845 series chipsets are already supporting DDR333 through some trickery on the part of motherboard manufacturers. Intel has only now released official support for the latest memory standard after choosing to wait until it could test and validate the RAM.

Unlike the last update to the 845 series, which brought along with it the new ICH4 SouthBridge with USB 2.0 support, the i845PE and i845GE do not bring any other new features such as AGP 8x to the table.

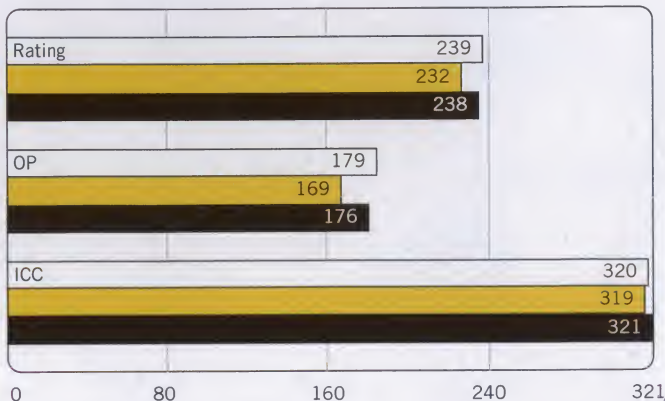
What this means is that the impact of the chipset is almost non-existent, especially considering the fact that there are already plenty of DDR333-supporting i845 boards on the market.

MSI has taken the i845PE and built the MSI 845PE Max2 motherboard. It features onboard audio, USB 2.0, molex replacement plug and onboard Gigabit Ethernet via an Intel RC82540EM chip. This is the first time we have seen this Intel Gigabit solution used on a motherboard, with previous releases using a Broadcom chip.

Support is also included onboard for IEEE1394, six-channel audio and extra USB 2.0 ports, all via motherboard headers and blanking plates. There are also headers for MSI's optional Bluetooth networking kit as well as a molex power plug replacement for those without an ATX 12V power supply.

We tested the 845PE Max2 board using a 2.4B GHz Pentium 4 CPU and 512MB DDR333. We compared the

SYSmark2002



Quake 3: Arena CPU settings



ASUS P4T533 MSI 845PE Max2 EPoX 4G4A+

results with both the speed champion RIMM4200-based ASUS P4T533 motherboard and one of the best DDR333-supporting i845G boards: the EPoX 4G4A+.

Testing was done using SYSmark2002 and Quake 3: Arena with CPU settings.

Unsurprisingly the 845PE Max2 and the 4G4A+ performed almost identically.

Intel seems to have nailed DDR333 support and delivers performance that is both highly stable and very fast with its chipsets. This is borne out by the fact that both the DDR boards are narrowing the gap with RIMM4200 RDRAM to an almost negligible amount.

The 845PE Max2 is another good board from MSI. It brings MSI's latest feature set of Gigabit Ethernet and a plethora of headers and extra ports to a more stable platform than the recently launched SiS648 chipset, while retaining bleeding edge performance.

The board alone is not a reason to upgrade, but when the inevitable comes and you want to make the shift to the next generation of Hyperthreaded Pentium 4 CPUs then this board will provide a stable and featured-packed performance platform for it.

SPECIFICATIONS

Intel 845PE chipset; DDR333 support; onboard Gigabit Ethernet; onboard IEEE1394; three DIMM slots; and six PCI slots.

Website: MSI www.msicomputer.com.au

Supplier: MSI www.msicomputer.com.au

Phone: MSI (02) 9748 0070 Price: TBA

8/10

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Lian Li PC6089



Ever since Cooler Master released its stunning ATCS range of cases, Lian Li has had to deal with the fact it no longer makes the premium range of PC cases. There, there, you'll get over it. Like many companies who aspire to be the number one company, Lian Li has resorted to copying the best of Cooler Master's designs and then selling them at a lower price. We saw it in the Lian Li mini PC boxes that are a clone of the Cooler Master series, and now we see it again in the new PC6089.

This case is a dead ringer for the Cooler Master ATC-201 we loved so much in *Issue 11*, right down to hiding the front of the case behind an acrylic door. However, instead of using a double layer of metal in the case's construction, the Lian Li model uses a single sheet. Because of this, the screws for the fans on the PC6089 are exposed on the case's exterior, whereas those on the Cooler Master are tucked away beneath the outer layer of metal.

While costs have been kept down with cheaper design elements, Lian Li has successfully retained most of the mojo of its Cooler Master inspiration.

Speaking of fans, the PC6089 arrives with four, and they're all of the 80mm variety. You have the standard rear and front fans, as well as a fourth in a blowhole position at the top of the case. However, in the current fan-crazy climate, fans don't a special case maketh – this is where the unique twin light up strips on the front of the case come in. Each has a high power LED at the bottom, lighting up each of these strips with a lovely shade of blue.

The PC6089 also ships complete with a Perspex window, although it has a strange pattern stuck to it that might not be to everyone's liking. To comply with Australia's EMF regulations, Lian Li has also had to place an Aluminium panel behind the Perspex, but this is easily removable.

Other than these features, the rest of the case is up to the usual high standards we have come to expect from Lian Li. When you consider this case is just as pretty as the more expensive Cooler Master ATC series, but at a more reasonable price, it's obvious that the PC6089 is a compelling purchase for those who value style as much as substance.

SPECIFICATIONS

210mm x 450mm x 490mm; acrylic front door and side panel; PSU not included.

Website: Lian Li www.lianli.com

Supplier: Anyware www.anyware.com.au

Phone: Anyware (02) 9879 5788 **Price:** \$439

8.5/10

Acer Aspire G600



Prebuilt systems are a rare sight in *Atomic*, but every so often it is refreshing to see just what is being thrown up by system builders and how well it compares to a DIY system. The Aspire G600

from Acer departs from the mainstream 'shove in the bare minimum' PC philosophy, under which NVIDIA graphics mean TNT level and Intel processor means Celeron.

The Aspire G600 packs a 2.4A GHz P4, MSI MS-6533G motherboard, 512MB DDR266, GeForce4 Ti4400, 80GB Seagate HDD, DVD ROM, CDRW and wireless keyboard and mouse, with the receiver built into the case. The top of the case features a separate LCD display, dubbed Audio DJ, that can be used to control the DVD-ROM drive and play music, even when the system is powered down. The case also has a built-in reader for Memory Stick, SD and MMC.

This combination delivers decent performance, with a 3DMark2001SE score at high resolution of 10,560 and a SYSmark rating of 212. This SYSmark2002 rating is lower

than we would expect from a system of this specification and could be boosted if the board used a 533MHz FSB rather than a 400MHz FSB, and DDR333 (which the motherboard supports) instead of DDR266. We tried running the RAM at 333MHz but the system refused to POST and a CMOS clear was required to get it running again.

The Aspire G600 is a reasonably spec'ed system, and the Audio DJ function and inbuilt wireless keyboard and mouse controller are both funky and handy, but overall there is nothing outstanding about the system. At the time of writing you could build an almost identically spec'ed machine for around \$3,000, and for a little more you could equip yourself with a real screamer of a PC.

Acer will sell you the base-level Aspire G600 for \$3,000 – the system we tested had extras like double the RAM, a larger hard drive and a better video card.

With no really standout features we would recommend that building your own system is cheaper and gives flexibility and brand choice that the Aspire G600 lacks. It's still a good system, just nothing special.

SPECIFICATIONS

2.4A GHz P4; i845G motherboard; DDR266; GF4 Ti; DVD-ROM; CD-RW; Smart Card, memory stick and MMC readers.

Website: Acer www.acer.com.au

Supplier: Acer www.acer.com.au

Phone: Acer 1300 366 567 **Price:** from \$2,999

7/10

**P4PB Ultra**

Mainboard

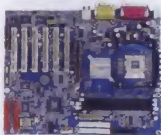
Xtreme Mainboards for Xtreme Users



The P4PB Ultra mainboard exudes Xtreme from the moment you set eyes on the screaming-head box packaging design. Open the box and you start to grasp the true extent of the extremities. The P4PB Ultra's performance and connectivity features are nothing short of breath taking. Throw in the ultra cool Modding Cables, Smart Media Panel and a host of other extras you are really talking about an Xtreme Mainboard for Xtreme Users.

ATX Form Factor

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- 6 PCI, 1 CNR
- Promise ATA/133 RAID 0,1
- IDE ATA/133/100
- C-Media 6 Channel Audio
- 10 USB 2.0/1.1
- VIA 10/100 LAN
- Smart Card/Memory Stick/SD Reader Support

P4PB 400



- Intel® Pentium® 4 Processor Support @ 533/400MHz FSB
- VIA P4X400 Chipset
- DDR333 SDRAM Support up to 3GB
- AGP 8X/4X
- 5 PCI, 1 CNR
- ATA/133/100
- VIA 6 Channel Audio
- VIA IEEE 1394 (Optional)
- 6 USB 2.0/1.1
- VIA 10/100 LAN
- Smart Card Reader Support

P4PB 266E



- Intel® Pentium® 4 Processor Support @ 533/400MHz FSB
- VIA P4X266E Chipset
- DDR266 SDRAM Support up to 3GB
- AGP 4X
- 5 PCI, 1 CNR
- ATA/133/100
- VIA 6 Channel Audio
- 6 USB 2.0/1.1
- Smart Card Reader Support



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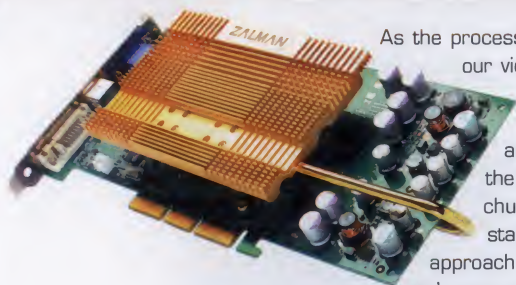
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Zalman ZM80-HP VGA HeatPipe Cooler



As the processors within our video cards continue to rise in speed and complexity, the heat they churn out is starting to approach the levels we're accustomed to seeing in a CPU. This has resulted in yet another component within the PC that requires a noisy cooling fan, making the video card HSF the second noisiest component. Zalman, also known as the Zen master of silence, has come to the rescue once again with the ZM80-HP VGA HeatPipe Cooler. Unlike most VGA coolers, it has no cooling fans, relying upon passive cooling, so you'll need to ensure your case is well ventilated.

Installing a VGA card HSF is usually a matter of ripping off the old one, and plonking the new one on top of a liberal dose of thermal gunk. Not so with this complicated Mechano-wanna-be, which comes with a 16-page installation guide. If you find these instructions too complicated you can download a video from the Zalman Website that takes you through the install, step by step.

Like everything Zalman does, this kit has all you need, right down to a mini Philips-head screwdriver and a spare set of screws and paste in case you lose the original set. It even has two

different mounts for the GPU to cater for different models of VGA card. Speaking of which, this kit isn't suitable for every VGA card on the market, with the Parhelia being a notable exception from the compatibility list. The popular GeForce and RADEON video cards are compatible, but you'll need to check your entire system configuration is also compatible. Due to its passive nature, you can't mount it in a system that has the AGP card above the CPU, as the CPU heat will increase the heat of the VGA cooler.

Once we'd installed this 435-gram brute onto a Sparkle GeForce4 Ti4600, it was time to see if it could handle the GeForce Grunt. We weren't concerned about temperatures, just whether or not we could overclock the Ti4600 to the same speed as with the stock cooler attached. And what do you know, we reached the same speed as with the stock cooler: 330MHz. A couple of hours of looped 3DMark2001 SE proved that the card was just as stable as with the noisy stock cooler.

Zalman has once again pumped its R&D department full of mind-altering chemicals to come up with a radical new design that does a great job while keeping noise levels down. O

SPECIFICATIONS

Aluminium heat sinks; Gold-plated copper heat pipe; weight: 435 grams.

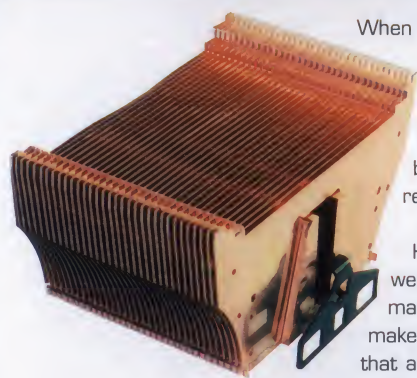
Website: Zalman www.zalman.co.kr

Supplier: Quiet Computer Sys www.quietcomputers.com.au

Phone: PC Case Gear (03) 9568 0932 **Price:** \$69

8.5/10

Thermalright SLK-800



When all-Copper coolers first hit the overclocking scene, the merits of using such an expensive material were negated by poor heatsink designs, resulting in shiny expensive paperweights. However, since then we've slowly seen more manufacturers learn how to make coolers from Copper that actually perform better than their Aluminium brethren,

and one of the leading manufacturers in this regard has to be Thermalright. The SLK-800 is the latest all-Copper AMD cooler from this company, and once again reinforces the notion that Thermalright knows what it takes to build a high performance HSF.

This cooler bucks the trend that bigger is better, measuring in at around 87mm x 48mm x 56mm, with the end result that it should fit any ATX motherboard. Considering the size, at nearly 500grams it's quite hefty, so make sure you mount it correctly unless you like the sound of motherboards snapping in the breeze.

Thanks to the unique 'steps' at the top of the heatsink, you can fit 60mm, 70mm and 80mm fans on the top of the cooler, depending on your threshold for audio torture. The mounting clip is very simple to fit, and not so tight that you'll risk a cracked core

every time you mount or dismount the unit. In keeping with Thermalright's high standards, the base is polished to a high sheen, and is extremely flat. No lapping necessary here folks.

We tested this unit on an Athlon XP 2100+ buckled into ABIT's new AT7-MAX2. The ever-reliable FOP-38 was also tested for comparison, and ambient temperature was a constant yet balmy 26°C thanks to a Labs air-conditioning unit that decided to take a holiday. This isn't as cool as the 20°C we usually do the testing in, but is more representative of your case's internal temperatures. The fan used for the testing was the same 7,000rpm 60mm fan that ships with the FOP-38. Our test results show that the SLK-800 had a great time smacking the FOP-38 out of the ballpark. Load temperature peaked at a very impressive 42°C – a whole 7°C cooler than the FOP-38's 49°C. Idle temperatures were also very respectable, cooling the Athlon XP 2600+ down to a record breaking 38°C, comparing very well to the FOP-38's 43°C.

This is without doubt the most impressive Athlon HSF cooler we've tested in the Atomic Labs, especially when you take into account the fact that it scored the best results we've seen while being hindered by a 6°C rise in ambient temperature. O

SPECIFICATIONS

All copper construction; 87mm x 48mm x 56mm; weight: 500grams.

Website: Thermalright www.thermalright.com

Supplier: PC Case Gear www.pccasegear.com

Phone: PC Case Gear (03) 9568 0932 **Price:** \$110

9/10





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Thrustmaster F1 Force Feedback Wheel



Thrustmaster has had a long relationship with F1 champion Ferrari, releasing licensed Ferrari steering wheels over the last few years. Fans of high-end sims can now rejoice, as Thrustmaster has released a new version of its Ferrari wheel, and this has to be the finest yet.

As you can see from the product shot,

Thrustmaster has replicated the real steering wheels from Schumacher and Barrichello's F1 cars,

going so far as to place mock carbon fibre on the front of each wheel, capturing the look of the real wheels.

The majority of the wheel is constructed of sturdy plastic, while the pedals have extensive Aluminium panelling, and there's an overall ruggedness inspiring confidence in this product's durability. Unfortunately the pedal base uses the traditional upwards-thrusting pedals configuration, unlike the revolutionary 'hanging down' method employed by Saitek in its Xbox wheel. The result is that the end user's feet hover over the pedals, and the stiffness leads to the base lifting during frenzied braking.

As well as the usual two gear paddles behind the wheel,

which are all Aluminium, Thrustmaster has added another two analog paddles below, perfect for clutching, or even braking and accelerating if you'd rather not use your feet.

The real test of a steering wheel is how it feels during a drive, so we fired up Colin McRae 2, which is our defacto steering wheel benchmark due to its wide range of force feedback effects. Force feedback was quite strong and mimicked a wide variety of sensations perfectly.

Compared to most other wheels we've tried, this unit has a weighty feel to its range of motion. It exhibits a slightly clunky feel when turning, as opposed to the silky smooth feel of a real car's steering wheel, which is most likely due to the cog-based force feedback mechanism. It's not a big deal, but it does detract somewhat from the overall realism.

While it has a couple of minor problems, this is still a worthy contender to the mighty MOMO series from Logitech. The fact that it's a near perfect replica of the real thing, matched by rugged construction and accurate force feedback effects, will surely satisfy the more serious driving game fanatic.

SPECIFICATIONS

USB; force feedback; plastic and Aluminium construction, gear paddles.

Website: Thrustmaster <http://au.thrustmaster.com>

Supplier: Guillemot www.guillemot.com.au

Phone: Guillemot (02) 8303 1818 **Price:** \$399

8/10

AOpen Titanium GT 360-degree speakers



The Titanium GT from AOpen is an interesting speaker set indeed. Unlike the odd design of the Jazz J8902 speakers reviewed in *issue 21*, there is a reason these have a rather peculiar shape. The left and right speakers are a

cylindrical shape designed to provide 360-degree sound, as opposed to standard speakers, which emit sound in one direction. A closer inspection reveals two 2in drivers facing each other, with a cone-shaped device between them to disperse the sound in all directions. A two-sided aero port is also used, generating bass through a vertical column of air that runs up the side of the speaker. The amount of bass this creates is minimal, but enough to prevent the higher tones sounding harsh.

The subwoofer is plain and simple. No biggie there, as subs are usually tucked under a desk or some other place out of eyesight, so looks aren't as important. Interesting, however, was the lack of buttons or dials. The power on/off, bass and volume adjustments can be accessed from a wired controller, which is a welcome feature we would like to see more of. That said, loss or damage of the controller would render the speakers useless.

When we played a few MP3s through this set the sound from the left and right speakers was quite amazing. The mid to high tones were impressively clear and responsive, regardless of where we were standing in the room. Unfortunately the system was let down by the subwoofer. The bass sounds were hollow and missing a decent punch. There was also noticeable distortion at higher volumes, more than we would expect from a system in this price range.

Pleasingly, the same didn't seem to apply when gaming. Ghost Recon and WarCraft III were our games of choice, with full and rich realistic sounds at all but the highest volumes. Voices were clear and sharp without sounding tinny.

The Titanium GT provides a great sound, except where decent bass is required, which can be often for most audiophiles. We've heard better systems for around the \$200 mark, however this design is new from AOpen, and it will continue to be improved. With a better subwoofer these speakers would score higher, as everything else about them is terrific. A 5.1 version will be available within a few months and we've been promised we can have a set to review.

SPECIFICATIONS

Subwoofer – 17W RMS; L/R Speakers – 6W RMS; frequency response: 60Hz-20KHz.

Website: AOpen www.aopen.com

Supplier: Bluechip Infotech www.bluechipit.com.au

Phone: Bluechip Infotech (02) 8745 8400 **Price:** \$199

6/10

Ailean's DOMINATION² GAMES SYSTEM

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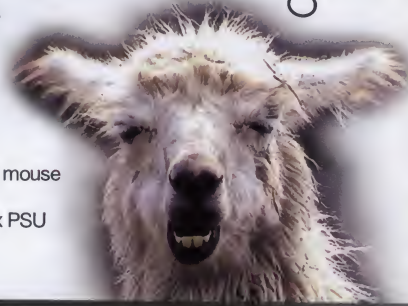
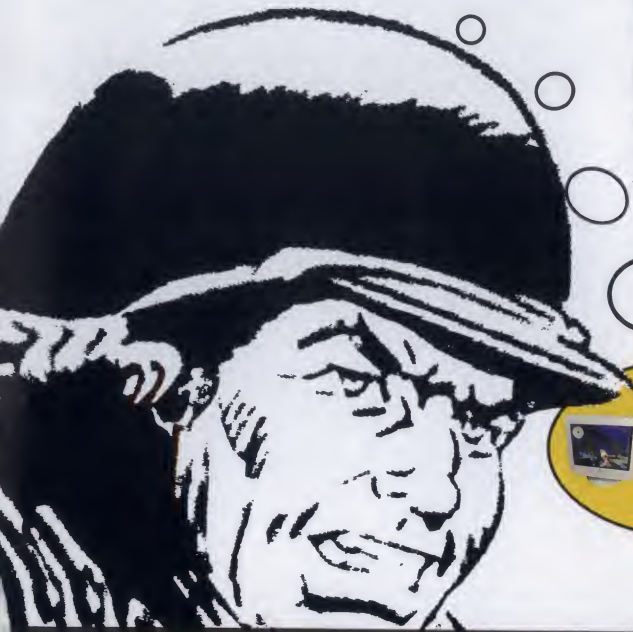
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Specs:

Two 19in flat screen monitors (yes!)
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Viontek GeForce4 4200/64MB
Gigabyte 8IEXP; 845E chipset,
533FSB, LAN, RAID, USB 2.0,
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DVD 16x48
FDD
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Logitech Z340 speakers
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	P4 2.53GHz (533MHz FSB)	\$509.00	SL-85MIV	\$159.00	GF4 Ti4200 128MB VIVO		\$449.00	512MB PC3200 (400MHz)		\$319.00			
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	P4 2.53GHz (533MHz FSB)	\$509.00	SL-85MR2	\$229.00	GF4 Ti4600 128MB		\$589.00	512MB XMS-3200 Corsair		\$389.00			
	P4 2.66kHz (533MHz FSB)	\$849.00	SL-85ERV	\$219.00	GF4 Ti4600 VIVO 128MB		\$719.00	1GB ECC Corsair		\$949.00			
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P4 3.0GHz (533MHz FSB)	\$1359.00	SL-85DR2+L RAID	\$239.00	V8170 GF4 MX Pro 64MB		\$199.00	128MB PC133		\$69.00				
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XP 1800+	\$169.00	A7V333-RAID	\$269.00										
XP 1900+	\$199.00	A7V8X	\$299.00										
XP 2000+	\$229.00	A7M266-D	\$529.00										
XP 2100+	\$275.00	SOLTEK - Socket A			Powercolor								
XP 2200+	\$349.00	SL-75KAV	\$139.00	SIS Xabre XP400 64MB		\$189.00							
		SL-75DRV5	\$179.00	Raedon 7500 64MB		\$169.00							
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MSI TV @nywhere



The vast majority of TV tuner cards are based around a Philips tuner, with the differences coming down to software bundles and card build quality. MSI's first foray into the TV tuner market differs from this by using a Silicon-based tuner coupled with a Conexant chip.

The real stand out aspect of the card though is the software package, MSI PVS, a customised version of Intervideo's WinDVR. Besides timeshifting functions like fast forwarding and rewinding TV playback via buffering on your hard disk, it also adds the ability to rebroadcast TV over a LAN or the Internet through real time MPEG 4 encoding.

MSI PVS also allows you to control the tuner remotely while watching, replicating all the functionality of the server on the client side.

Image quality from the tuner is outstanding, however it is slightly let down by a couple of things: the lack of a fine-tuning facility and a slightly clunking channel tuning interface – once you push past these limitations, the card really shines.

In reality, the software package is probably unfeasible to use over the Internet, considering the tight caps on broadband accounts, but for those running a home network the benefits are great. You can place the card in a centrally located machine, sitting near the aerial or cable TV connection and then access good quality pictures via the network, rather than settling for extension cables or the trauma of rabbit ear antennas hooked up to your home PC. Chuck a big enough hard drive into the system with the tuner and you have a feature-packed digital recorder for your television viewing.

TV @nywhere is a good quality tuner card, but the things that make it really shine are the software package and rebroadcasting facilities. For a single PC setup this software is overkill, however when hooked into a network as part of a home entertainment setup, the TV @nywhere comes into its own. □

SPECIFICATIONS

Silicon tuner; Conexant audio/video decoder; remote control; PAL and NTSC support; MSI PVS software bundle.

Website: MSI www.msicomputer.com.au

Supplier: MSI www.msicomputer.com.au

Phone: MSI (02) 9748 0070 **Price:** \$149.00

8.5/10

LifeView FlyTV-Box



LifeView has ten years' experience making video capture products, including a range of TV tuner-type devices, so we had high expectations for its latest product: the FlyTV-Box. A

standalone TV tuner/video box, the FlyTV-Box is similar in function to the Jaton X-Media Dream Box we reviewed some months ago: it's designed to capture a TV or video signal and display it on your LCD or CRT monitor, without software and without your computer needing to be connected. However, there are a number of different features: it can be set up to pass through your VGA signal while external devices are connected to it; it performs a picture-in-picture function by overlaying a window onto your operating system's desktop; and it can be packaged with an optional FM tuner.

The box itself is nicely designed, with six buttons to perform some of the functions, such as selecting the video source, channel selection and volume, while on-screen display settings, such as brightness and resolution, are controlled with the supplied remote.

Unfortunately the unit doesn't perform nearly as well as hoped. Setting up using the supplied pass-through cable caused

our CRT desktop display to lose a little of its sharpness. The displayed TV image in full screen, although smooth and flicker free, was noticeably pixilated, detracting from the overall picture quality. When set to picture-in-picture mode, this problem became considerably more pronounced, resulting in a very blocky image. The picture-in-picture mode also affected the rest of the desktop display, causing apparent ghosting and a reduction in overall sharpness and brightness. We found we couldn't use the device if the VGA resolution was higher than 1024 x 768, nor could we change desktop resolution while the device was running.

Another disappointment was the lack of ability to manage channel presets: with 128 channels present, which do not correlate with Australian television channel numbering, the task of scrolling up and down to find the station you are after becomes onerous and annoying.

Considering that LifeView has been working with VIVO and TIVO products for some time, we expected much better – compared to the Jaton X-Media Dream Box, this one is difficult to recommend. □

SPECIFICATIONS

NTSC, PAL BG+DK or PAL DK+I system; inputs: one composite video and one S-Video; output refresh rate: 60Hz to 75Hz.

Website: www.lifeview.com.tw

Supplier: Rectron www.rectron.com.au

Phone: Rectron (03) 9561-6166 **Price:** \$249.00

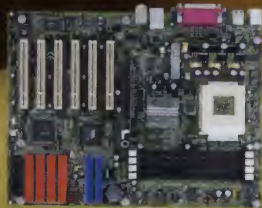
4/10

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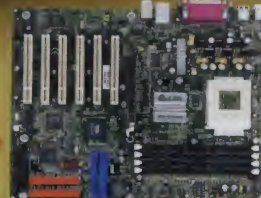


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- Supports digital SPDIF function
- Supports 10/100Mb LAN connection
- ATX Form Factor

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- VIA KT400 Chipset (KT400+ VT8235)
- Supports 4 PC2700 DDR SDRAM memory slots up to 4GB
- 6PCI, 1AGP(8X)
- Supports 2 IDE ports compatible with 2 PIO/Ultra DMA-133 devices each (Up to 4 devices total)
- Extra 2 IDE ports:
HPT372 controller supports Ultra DMA-133 & RAID 0, 1 and 0+1
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- AC97 PCI-based sound (8CH Audio), USB2.0 (2 Optional), 1P, 2S, PS/2 Keyboard and Mouse, audio I/O, and shared game/MIDI port
- Supports digital SPDIF function
- Supports 10/100Mb LAN connection
- ATX Form Factor

EP-8K9A2+



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Apple iPod for Windows



Dear God, what is the world coming to? We have Bush beating the war drum to invade Iraq, McDonald's stores popping up in China, and now this – an Apple product in *Atomic* magazine.

Getting a Hot Award no less.

Just when you thought Apple was doomed to un-*Atomic*-ness, it only goes and releases the greatest damn portable MP3 player music-kind has ever used in the destruction of eardrums.

With a whopping 10GB of hard drive space crammed into the stainless steel case, you can be sure that this

little player is going to have more than enough capacity to keep your ears happy. 32MB of this disk space is taken up by the player's embedded RTXC operating system, but that's barely a drip in the bucket of storage space on offer. To fill this large drive, you're going to need a FireWire port – no sluggish USB ports here folks. MusicMatch is included to rip and upload MP3s, but it has its fair share of quirks, so use one of the many home brew uploaders instead.

At a weight of 190 grams, the iPod isn't quite as jogger friendly as the miniscule MP3 players we've seen of late, but it will still fit quite comfortably into your jeans pocket. The interface

for this player is a little more complicated than most, but that's only because it has more functions than simply playing music.

You can store up to a thousand contacts in the contact database, or even play the Breakout clone on the iPod's large LCD screen. If this isn't enough for you, a thriving iPod hacking scene has spawned to give this gadget even more functionality, including applications to get around that pesky thing known as copy protection. Head over to www.ipodhacks.com to check out some of the nifty tricks you'll be able to do with your iPod. To get around the various menus, the iPod uses a very funky pressure sensitive scroll wheel.

The iPod sounds so good that hooking it up to a set of speakers and using it as your home MP3 box is a very feasible option. Not only is the sound crisp and clear, it's also deafeningly loud if you so desire. We never thought we'd say this in *Atomic*, being the Apple-dissing bigots that we are, but this product is amazing in every regard. From its stylish looks, to the huge storage capacity and right through to the stunning sound quality, the iPod redefines what an MP3 player should be.

SPECIFICATIONS

FireWire port; 10GB hard drive; supports: MP3 (up to 320Kb/s), MP3 Variable Bit Rate (VBR), WAV and AIFF.

Website: Apple www.apple.com/ipod

Supplier: Apple Australia www.apple.com.au

Phone: Apple Australia 133 622 **Price:** \$845

9/10



3ds max5



Discreet has released a major and very welcome upgrade to its flagship 3D modelling, animation and rendering software, 3ds max. Many new features subtly improve

the interface interactivity and productivity but discreet's major changes to rendering, character animation and polygon modelling make 3ds max5 one of the most feature-rich and useable 3D tools on the market.

One of the most sought after features omitted from 3ds max until now was Global Illumination and radiosity rendering. Autodesk's (discreet's parent company) Lightscape rendering engine has been integrated into 3ds max5 enabling photorealistic rendering of images via radiosity and photometric lighting, translucent objects and soft shadows with accurate fall-off.

Radiosity allows lighting effects such as bounce and colour spill between objects to be reproduced with true physical accuracy, making the difference between images that look like computer graphics and those that are believable as real.

Daylight, Skylight, Light Tracer and photometric lights all contribute towards creating realistic indoor or outdoor lighting and shadow simulation. A new translucent shader allows light to

pass through non-opaque objects such as frosted glass.

3ds max5 now includes a cartoon texturing system called Ink 'n' Paint, for rendering a variety of cell-shaded and outlined images. Character set-up has been simplified with the inclusion of a Character Assembly system. Fully rigged skeletons can now be treated as characters, rather than just a complex system of linked bones, with a new 'head' object and 'character' icon that can drive the movements of the rest of the assembly.

Skin Pose allows the character to return to the original mesh position for envelope tweaking but also makes it possible for animation 'clips' (such as walk, run or jump sequences) to be created, saved out, imported or blended onto the same or even different characters. Set Key allows entire character poses to be set and stored rather than having to keyframe each individual controller object. Spline IK gives realistic movement control to long chains of bones such as tails via Bezier splines.

The inclusion of Reactor giving real-time interactive rigid and soft body dynamics and fluid surfaces along with a host of improved modelling tools makes 3ds max5 a fantastic upgrade to an already powerful and established 3D application.

SPECIFICATIONS

3ds max5 3D animation software with advanced character setup, global illumination and real-time physics simulation.

Website: discreet www.discreet.com

Supplier: Scholastic New Media www.scholastic.com.au

Phone: Scholastic New Media (02) 4329 9209 **Price:** \$6,990

9.5/10

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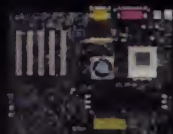
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- Dr. Voice Debug function
- 1 MHz Stepping CPU Frequency

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- Dr. Voice debug
- Realtek Lan onboard
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- 1MHz FSB Stepping

MX46L



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- ATA133
- Integrated VGA, AC97 Audio
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- Realtek 10/100 Lan onboard

MX4LR



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GAMES

My new PC

Bennett Ring is happy this month – he just scored a new PC. A PC so powerful that he's a little worried it might lock him outside of his airlock.



I got a brand new computer this month. Hurrah! A beast that could run even the newest of games at stupidly high resolutions (we're talking 1,280 x 1,024, no sissy 1,024 x 768 for this brute), with each and every graphic detail slider set to the 'Don't even try this setting, Fool,' marker. My new PC takes one look at these insanely high settings, explodes into a bout of maniacal laughter like one of the crazy guys you find sleeping on their luxury doorsteps in the CBD, and then asks for more. So I gave it more, as hard and fast as I could. 'You think you can handle SOF2 at 1,280 x 1,024 with 4x antialiasing and 4x Anisotropic Filtering? Then suck on this, mofo!' At this stage I loaded up the UT2003 demo, cranked it all the way up to 1,600 x 1,200, and sat back to watch the slideshow. But my new PC churned through the frames like a red-hot chainsaw through a 40kg roll of salami, not even flinching at the obscene amounts of polygons the UT2003 engine throws on screen.

Even Mafia, a game that brought the GeForce4 Ti4600 to its knees with tears in the corners of its RAMDAC, ran as smoothly as a slug's foreplay. At this stage, I was starting to get very scared, convinced that a machine this fast had to be the produce of Satan.

John also got the same PC this month. His results were even more impressive. How could they be, I pretend to hear you ask? Well, for the last 200 or so words I've been lying. I didn't get a new PC, and neither did John. Ha, and you believed me. The truth of the matter is that we've both had an 'extended test' of the RADEON 9700 Pro. Which means we smuggled it out of the Atomic Labs in one very stretched body cavity, into our home PCs, before playing a shitload of games. All in the name of research, of course.

So, why were John's experiences so impressive? Well, I run a 2.4AGHz P4

at home, so you'd expect blazing frame rates when this CPU is paired up with the 9700 Pro. But John runs a 1.2GHz Thunderbird Athlon CPU (stop snickering) from the Jurassic era.

You'd think that he wouldn't be able to run the latest and greatest games with every graphics setting cranked to insano levels due to this relatively dated, and let's face it, weak CPU, even with something as beastly as a 9700 pumping out the triangles. But with the 9700, it's as if the CPU doesn't matter any more. Just as I had experienced, everything John threw at his PC ran beautifully. Even Mafia. If you've ever played this game, after spending the obligatory 43 hours tweaking it to run well, you'll understand what a feat this is.

We both came to the same conclusion: moving from a GeForce4 to the RADEON 9700 Pro felt as if we were running an entirely new system. Which got us thinking – do you really need to upgrade your memory, motherboard, CPU, PSU and every other expensive bit of hardware in your PC to get your games to run well? Apparently not, provided you spend \$800 or so on a new 9700. Of course, if you're running a 600MHz Cyrix CPU with 64MB of PC100 SD-RAM, you might not get the same results we did, but that serves you right for trying to game with a Cyrix CPU. We've come to the totally unscientific conclusion that if you're looking for a simple upgrade, and happen to be running a CPU of around 1GHz or better, the 9700 looks like a very attractive option.

If you own a titchy 15in monitor, don't bother, as a display device this pathetically small will shrink your text to around 25 microns in height when running at high resolution. But again, this serves you right for having a postage stamp for a monitor.

It's great to get some real world experience with the 9700. Benchmarks

are one thing, but playing Battlefield 1942 at 1,280 x 960, with AA and Anisotropic filtering enabled is something else. Something that just happens to be incredibly fun.

And satisfying.

But enough of my pimping the 9700. All I know is that the unit I was testing with has to go back to the supplier, and my PC is half the machine it was yesterday. Now where'd I put that damn box of tissues?

You've gotta love this time of the year. Over the last few weeks we have been inundated with a steady stream of kick arse, totally addictive games.

The ones that have caused me to neglect my better half include Buffy, The Thing, Mafia, UT2003, and of course, Battlefield 1942. And the stream of Chrissy releases has only just begun.

Speaking of BF1942, I have a feeling that once some of the kinks have been sorted out it could end up being the greatest multiplayer shooter in the short history of online shooters.

That is, provided the 50% of players who sit at the end of the runway waiting for a plane to spawn, while all their team's capture points get overtaken by the one enemy soldier left strolling around the field on foot, figure out that you ain't gonna win this game by flying the Zero into the ground at high speed.

But I won't go on about this amazing game, because John's reviewing it this month, and I'm sure you don't want to read about it twice.

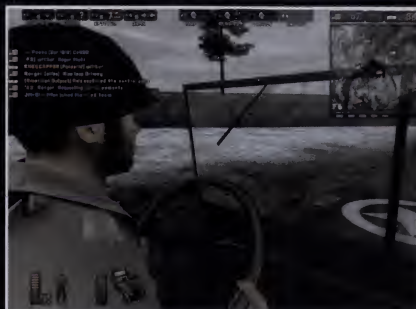
The point I'm trying rather inadequately to make is that we have a mammoth lineup of quality games heading our way – even better than last year's. And it's only going to get better as each year passes. That's the nifty thing about the evolution of game development – games are just going to keep on getting better and better. Which means that life as a gamer can only get better and better. . .

Battlefield 1942

John Gillyooly takes part in the best Omaha Beach landing so far.



ABOVE: A Corsair tries to avoid coping flak



ABOVE: Catching a cab, WWII style



ABOVE: Stalking the enemy from below the waves

Over the years many a beer has been downed while debating what makes an online game special. After all, despite the myriad titles launched with a multiplayer component, only a few have actually made a lasting impact. After much deliberation (and accompanying slurring and wild gesturing) a theory has emerged: the best online games provide a simple framework, where depth and longevity come from the human component. A good game will have players developing strategies developers never contemplated.

Enter *Battlefield 1942* (BF1942), made by Digital Illusions CE, it's the spiritual successor to the cult multiplayer hit *Codename Eagle*. With a strong multiplayer focus (single player consists of a campaign played against bots on the same maps as multiplayer), the game is structured around 16 famous battles, spanning Western Europe, Eastern Europe, North Africa and the Pacific Theatre. And yes, there is an Omaha Beach landing mission.

Rather than the small scale, traditional shooter approach of recent WWII hits such as *Medal of Honor* and *Day of Defeat*, BF1942 takes a grander scale and adds a host of vehicles. There is a generous mix of air, sea and land-based craft for you to control, all grounded in reality but modelled with a focus on fun gameplay.

The maps cover a wide range of scales: there are tight street fighting levels including Berlin and Stalingrad; large-scale tank battles including Battle of The Bulge and El Alamein; and open-ocean maps of Midway and Iwo

Jima with small islands. Over all these maps Digital Illusions' Refractor2 engine runs beautifully, and scales well from low to high-end machines – in fact the most resource intensive aspect of the game is the server, whose requirements are edging on insane.

This server grunt is needed to facilitate the large number of players that BF1942 can accommodate. While it can theoretically support 64 players on a map, this translates to a realistic limit of between 24 and 32 players or the game chugs. Having 32 players on a server is still an amazing thing, something you don't really appreciate until you are rolling across the desert in a tank column, with a B-17 bomber cruising slowly overhead trying to carpet bomb you all into oblivion. Whatever aspect of the battle you are focusing on, there will always be other conflicts happening around you.

There are currently some problems with Internet play, with large ship-filled maps being especially problematic. This is partially due to the netcode and partially due to people running the game on under-spec servers. To remedy this, the in-game server browser indicates when the game is under load, and the server variable list shown in browsers such as All Seeing Eye (www.udpssoft.com) includes the CPU speed, which is a good thing to check before you log on.

There are four gameplay modes available for online play: Team Deathmatch, CTF, Co-Op and Conquest, although in reality most servers are running the unique Conquest

mode. This is a variant of the under-appreciated capture and hold gameplay style, in which there are a series of points on the map that must be captured by each side. Scoring is based upon 'tickets': team scores that count down as the enemy holds points or kills players. The battle finishes and the victor is decided when one team's ticket-count reaches zero.

This structure works incredibly well, and accurately reflects how the battle swings.

When all of these aspects are combined we have one of those strong frameworks for online gaming. There is no 'killer' vehicle, everything is beautifully balanced with the most powerful usually slow and or poorly armoured. Like any new game, the netcode is an issue from two aspects. The first is that gamers simply have to get used to the quirks, and the second is that Digital Illusions needs to continue polishing the code. Hopefully the soon-to-be-released Linux server for the game will go some way to mediating this as well.

Digital Illusions has done a great job on BF1942, supplying us with a refreshingly new take on online gaming. As the game matures and the glitches are smoothed out it will only get better. Invading Normandy has never been so much fun.

9/10



GAME DETAILS

FOR: Refreshingly different online gameplay; huge maps; and vehicles galore.

AGAINST: Netcode still needs some work; hefty server requirements.

REQUIREMENTS: 500MHz CPU; 128MB RAM; 1.2GB HDD; and 32MB hardware T&L video

RECOMMENDED: 1GHz CPU; 256MB RAM; 64MB video card; and broadband Internet

SOUND APIS: Direct Sound **VIDEO APIS:** Direct3D

DEVELOPER: Digital Illusions CE www.dice.se

PUBLISHER: Electronic Arts www.eagames.com

DISTRIBUTOR: Electronic Arts www.eagames.com

PHONE: Electronic Arts (02) 9264 8999

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Mafia: The City of Lost Heaven

John Gillooly breaks the Omerta on life in the mob



ABOVE: Don't like the menu? Firebomb the cafe!



ABOVE: The handcuffs indicate the cops want you



ABOVE: Hijacking in progress – who's ya Baddy?

If you're a game, being good is OK but being bad is really good. For all the times we've played on the side of Truth, Justice and the American Way, what most of us have really wanted to do is take the side of the baddie. It's a philosophy that has made a big contribution to the success of games like Grand Theft Auto and X-Wing vs TIE Fighter. Perhaps the most romantic of all criminal types is the Mafia, which has spawned innumerable books and movies over the years.

Illusion Softworks has taken the mystery of the Mafia and built an amazing, story-rich game around it. You play Tommy Angelo, an unsuspecting cab driver sucked into the world of The Mob via a freak run in one night with some injured gangsters. The game revolves around Tommy recounting his rise to power as you play out the highlights of his career.

Rather than adopt a modern day approach like GTA 3, Mafia takes us back to the halcyon days of the 1930s, where cars were slow, booze was banned and justice was dispensed from the end of a Tommy gun. Over the years while Tommy works for Don Salieri you get to live out nearly every Mafia cliché: rooftop chases, bombings, assassinations, car chases and bank heists. Cut scenes tie the action together perfectly, thanks to strong voice acting and amazingly detailed characters. It takes place in the fictional City of Lost Heaven and the surrounding countryside, rendered beautifully by Illusion Softworks' proprietary LS3D engine.

Lost Heaven is a living, breathing 3D

entity, similar to GTA3's Liberty City, but with much greater depth, detail and feeling of immersion. There is a sense of life going on around you as you go about your criminal business, which is an amazing achievement considering the size of the city. The city is so big that, while you can be happy in the knowledge that the storyline will take you to all corners, you will still be discovering new areas when you move on to the game's secondary Freeride mode.

While the game is built primarily around the Story mode, there are two secondary modes: Freeride and Freeride Extreme. Both of these are based more around open-ended GTA3-style gameplay, with the extreme variant removing the ever-present police force and adding some truly quirky and oftentimes insane challenges to the mix.

As expected, the release of this game was accompanied by some crazy promises by the developer: Illusion Softworks has chosen to state that the car physics in Mafia are the most accurate yet, above and beyond the Gran Turismo level of realism. While I can't vouch for that, the cars do indeed handle with unique characteristics. These may not be too much of an issue when cruising around obeying the speed limit, but once you open up the throttle it takes skill to throw each car around, and it gets more and more difficult as in-game time passes and the cars move from true 1920s clunkers up to high-powered aerodynamic models.

When you leave the cars the action

switches to an over-the shoulder third person mode for all your baseball bat or shotgun wielding needs. The camera is a true joy: it's non-invasive, accurate and seldom stuck (unlike most third-person games where you feel you are fighting against the camera as well as the guys coming at you with guns). Gunfights are especially fun, with locational damage on both characters and vehicles acting in concert to have you ducking for cover. You'll spend many tense moments crouching behind recently abandoned cars as they get peppered with bullets – windows giving way, tires being shot out and a fiery death just a matter of time.

The game is not without its issues: it shipped with some nasty bugs that should be patched by the time you read this, and the promised multiplayer was left out to be included in a patch at some indeterminate time in the future. Luckily the game stands head and shoulders above the pack on its single player merits, so this is not as much of an issue as it could have been.

Illusion Softworks has created a minor masterpiece. Graphically rich and diverse and with a storyline other games would kill for, Mafia may not quite be an offer you can't refuse – but it comes damn close. O

9/10



GAME DETAILS

FOR: Gripping storyline; gorgeous graphics; and extra modes to enhance replayability.

AGAINST: Buggy; no multiplayer.

REQUIREMENTS: 500MHz CPU; 128MB RAM; 1.8GB HDD; and 16MB video

RECOMMENDED: 1GHz CPU; 256MB RAM; 1.8GB HDD; and DX8-compliant video

SOUND APIS: Direct Sound; EAX **VIDEO APIS:** Direct3D

DEVELOPER: Illusion Softworks www.illusionsoftworks.com

PUBLISHER: Gathering Of Developers www.godgames.com

DISTRIBUTOR: Take2 Interactive www.take2games.com

PHONE: Take2 Interactive (02) 9482 3455

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SHE'S SEXY...**

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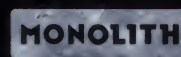


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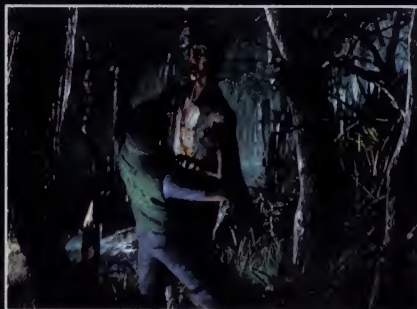
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Resident Evil

Bennett Ring asks 'Will you take the green herb. . . again?'



ABOVE: 'I love you. I want to eat your brains!'



ABOVE: Character detail is simply stunning. . .



ABOVE: . . . As are the lighting and shadow effects

The GameCube needs some killer westernised titles to boost its flagging sales in Australia this Christmas. When we say westernised, we're actually referring to copious amounts of blood, gore and brain fluid. What better then than a remake of one of the most successful, violent, and downright spooktacular games of all time: Resident Evil. But just how good can a game be when we've seen it all before?

The answer is: pretty darn good indeed. Newcomers to the series will enjoy it more, as everything will still be new and fresh, but even long time fans will find this revamp has enough new bits to keep them happy.

This is a remake of the original Res Evil game, not a sequel, which means that it follows the storyline of the original game very closely, although it's not quite identical, with several new areas, creatures and plot events. The game starts with a pre-rendered movie that sets up the story: you're a member of the S.T.A.R.S team, searching for teammates who have crashed their chopper near a mansion that looks better suited to housing demon spawn than rich, snooty types. Even this pre-rendered movie has been totally remade, and the result is an impressive piece of 3D animation, to rival even Blizzard's masterpieces.

Once the game starts, the familiar pre-rendered Resident Evil background will fill your TV screen, complete with the static non-moving cameras we all love to hate. But this time the graphics look better than ever. Using some Nintendo technical wizardry, the developer has managed to combine video with

the pre-rendered backgrounds. A wide variety of lighting effects have been simulated using this video technique, from lightning flashes to swinging candelabras, for breathtaking results. This technique also allows for parts of the background to move, such as grass swaying in the breeze. Somehow the developer has even managed to project real time shadows from the characters onto these backdrops, helping to remove the feeling that the 3D characters aren't really a part of the background – a problem suffered by the original engine. Speaking of which, the 3D character models are some of the most detailed yet seen on a console, surpassing even the intricate models found in MGS2. The creature models ooze so much detail that they really do capture the look of a bundle of decaying flesh and pus.

While the graphics are very impressive, the age-old problem of controlling your character from static camera viewpoints is still apparent. True 3D engines don't have this problem, as the floating camera usually displays the action in the most appropriate manner. However, the static cameras in Res Evil are often in the most unhelpful position possible, making simple tasks such as defeating an enemy located near a corner incredibly difficult. Even walking in a straight line takes practice due to this camera system. This is the biggest problem with the game, and something we thought had been left behind for good with the release of the true 3D Resident Evil game, CODE: Veronica X. By

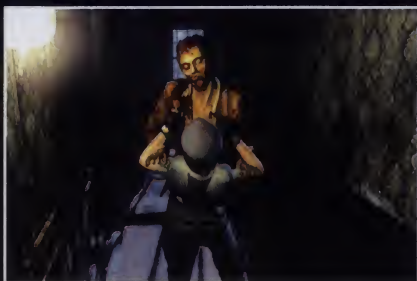
reverting to these 2D backgrounds, it feels as if the series has taken a major step back. There is also a slight pausing when switching between camera views as the new background is uploaded into the GameCube's memory, and the dreaded 3D door opening sequence, used to cover loading times between sections, remains tiresome.

The gameplay is unchanged from the original, so while there's plenty of action, most of your time will be spent figuring out how to get past the many devious puzzles, some of which will turn even the most intelligent gamer into a frustrated gibbering mess.

One new feature has been added, in the form of defensive weapons. If you're grabbed by a zombie or other creature and happen to have one of these defensive weapons equipped, you can extricate yourself from their grasp with a quick stab or two. It's not anything special, but at least it's new, right?

For a game that plays almost identically to the six-year-old original, Resident Evil still manages to remain entertaining and, due to the killer new graphics engine, visually impressive. Unfortunately it's not the AAA title we were expecting, as the same problems the original suffered from have made a comeback in this remake.

8/10



GAME DETAILS

○ **FOR:** Stunning new graphics engine with animated backgrounds, resulting in an even scarier game than the original.

○ **AGAINST:** Crappy camera system to the power of three – this is 2002, not 1996. Other than the graphics engine, there isn't much new to be seen here.

DEVELOPER: Capcom www.capcom.com

PUBLISHER: THQ www.thq.com

DISTRIBUTOR: THQ www.thq.com

PHONE: THQ (03) 9573 9200



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Buffy The Vampire Slayer

Bennett Ring sinks his teeth into the game of the TV series of the movie.



ABOVE: Super Soaker done Buffy death style



ABOVE: Stick around – we'll grab a bite later



ABOVE: One of the many special effects in the game

Buffy the Vampire Slayer – The Movie is a great example of how much a big-budget Hollywood bonanza can suck. *Buffy the Vampire Slayer – The TV show* is a great example of how witty dialogue, spooky bad guys and the obligatory hot chicks can make a crappy movie into an excellent cult TV show. Now we have *Buffy the Vampire Slayer – The Video Game*. . . Does it bite the big one like the movie, or does it display some of the class that made the TV show so popular?

You'll be pleased to know the developer has created a game worthy of the vampire mashing goddess we've come to know and love over many a late night of TV. From the furious fight scenes, of which there are many, to the wigginsy locales (Note to Ed: yes that is a word, if Buffy says it, it must be), to the sassy sense of humour, somehow most of the Buffy Goodness™ has been squeezed into this 3D beat 'em up. It's set at the end of Series 2 (actually, it's right after the first show of Series 3, but only a Buffy fan with no life would know that), and has Buffy facing off against The Master one last time. The Scooby Gang and others make regular appearances, with great voice acting from the real actors who portray Xander, Willow, Cordelia and Giles in the show; unfortunately, snooty Sarah Michelle Gellar couldn't find time to lend her voice box to the game. Thankfully her stand-in has mimicked the goddess well, and mostly you won't realise it's not Sarah's voice.

The game plays very similarly to the classic *Tomb Raider* series, with a dash of

Tekken thrown in. When you're not opening a family sized can of whoop-ass on the undead, you'll be walking around dark and dingy levels trying to figure out just why these beasties need a severe spanking.

Being on Xbox, you'd expect the game to look almost as hot as its real life counterpart. And it does, showing off gorgeous levels filled with life-like vampires, zombies and other nasties, all topped off with some of the nicest special effects seen on a console. Especially worthy of praise is the job the animators have done capturing Buffy's signature moves like the flying triple kick perfectly. Some of the fight scenes can be very tough, with vampires requiring a strategically placed wooden spike before they'll give up the fight, while zombies will only quit after being decapitated.

A wide variety of combos, kicks and punches should see you through most of the bizzo, but when things get tough, the tough get hardcore weaponry, including flamethrowers, crossbows and double-edged blades. And if the brown stuff really hits the fan, Buffy is able to dodge, duck and block her way out of most attacks. If you don't happen to have a spike handy to take out that last vamp, why not throw him into a patch of sunlight or onto that bit of wood conveniently sticking out of the ground? Considering it's a 3D platformer, Buffy represents the hands-on action of the TV series especially well.

Things aren't all rosey in Sunnydale though, with a couple of sticklers that stop this from being a perfect beat 'em up. If you

thought you'd seen your last jumping puzzle in *Tomb Raider 17 – Lara's Twin Peaks*, think again. Especially towards the end, you'll soon find yourself ruining the day the designers had the thought that gamers still enjoyed jumpy sections. Something that isn't uncommon on consoles is a sucky save game system, and Buffy is no exception. You'll often trudge through 20 minutes of dark dungeon only to fall down one of the aforementioned loveable jumpy bits. So you'll have to do the entire previous section again. I'm all for strategic save game locations to create tension, but the system in Buffy suggests that the designers implemented it just to make the game longer. And at ten hours or so in length, it won't take you long to beat this game, with zero replayability once you've seen all that Buffy has to offer. No multiplayer, no hidden sections, no nothing.

But boy is it fun while it lasts, provided you learn from the mistake that caused you to play level 6 four times before you completed it. Fans of the show are bound to get sucked into Buffy's latest quest, and even non-Buffy believers (otherwise known as normal people) are sure to have a great time cracking ghoulish skull. Just don't expect it to be perfect, nor for it to last forever.

8/10



GAME DETAILS

FOR: Finally you get to play with Sarah Michelle Gellar; cool fight scenes with lots of moves; and graphics that Xbox owners deserve.

AGAINST: Jumping sections; frustrating save game system; and short overall game length with a severe lack of replayability.

DEVELOPER: The Collective www.collectivestudios.com

PUBLISHER: Fox Interactive www.foxinteractive.com

DISTRIBUTOR: Electronic Arts www.electronicarts.com.au

PHONE: Electronic Arts (02) 9955 7744

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Project Zero

Busting makes Des McNicholas feel good.



ABOVE: 'Shooting' ghosts doesn't mean killing them



ABOVE: We all feel like this sometimes



ABOVE: Beautiful design and lighting

The shades of Warped Men, Hanged Women and Wondering Monks are all on hand in this frighteningly unsettling horror title from Tecmo that manages to take the popular horror-survival genre to a new level. Players will be familiar with the wander-through-the-dark elements of the game, but Project Zero (called Fatal Frame on overseas release) has enough twists and unique gameplay elements to make it stand well apart from earlier horror titles. The terrific combination of sights, sounds and foreboding atmospherics will make the most seasoned player jump once or twice, because Project Zero is the closest thing most of us will come to being the idiot that just has to walk up the creaky stairs in a haunted house movie – and it's also a great example of console game production values.

Allegedly based on a true story, Project Zero puts players into the role of the mini-skirted Miku as she searches the ominous Himuro Mansion for her brother Mufuyu. Cadet journalist Mufuyu disappeared while looking for the famous novelist Junsei Takarmine, and it quickly becomes clear that the house has something to hide. The playable prologue sets the pace nicely, giving players the chance to relive the last known moments of Mufuyu in a mix of sepia tones, black and white images and great screen effects, before the game proper kicks off with Miku following in his footsteps. It's an excellent approach that unravels a little of the mystery and drags players into the quest of discovering the secrets of Himuro Mansion.

Aside from the obvious need to rescue kith and kin, Project Zero poses some other interesting challenges and a unique approach to combat and power-ups. The only weapon is an antique camera, with which players must try to grab happy snaps of the less aggressive undead and destroy those that get in the way. The overall game score is influenced by the number of ghosts captured on film, as players slowly build up a photo album to impress their friends. It works well – thanks largely to terrific spectral effects – and the chance to go back in to beat the score adds a small degree of replay value. Weapon enhancements come in the form of improved films found lying around the mansion and the odd camera upgrade to inflict extra damage or special attacks on cantankerous ghosts.

Project Zero has a simple and effective control system that's very well suited to the gamepad. The normal perspective is third person, but play jumps to first person once the camera is used. Camera and character movement can be controlled independently, allowing players to back away or advance while lining up that special shot. The camera view is realistically narrow, adding an eerie touch, and the ghosts have a nasty habit of vanishing and reappearing from unexpected directions. Combat is simply a matter of getting the target correctly in the reticule and squeezing the shutter, although most ghosts need several hits to dispatch and they don't just float and take it. Being touched by a ghost can be disastrous, and herbal medicine

is scattered around the place to speed up recovery from ectoplasmic attacks.

Tecmo has matched the simple controls with a very clean interface and some good player aids. The screen displays a life bar, the number of exposures left, spirit stones collected and a filament that flashes when ghosts are nearby. The on-screen advice is supported by an excellent 'heartbeat' indicator via the dual-shock controller, great mood music and the hiss of static at key moments. Accessing inventory items such as film and medicine is relatively straightforward – although the overall menu system is a little clumsy – and the camera does a reasonable amount of thinking for itself. Some players will think there's too much early warning, but Project Zero remains a very tough game.

Project Zero absolutely shines in the atmosphere stakes: the on-screen effects are outstanding, and excellent use is made of music, lighting and the building of tension. It certainly suffers from repetition at times, as players are required to revisit old areas, but unexpected ghosts keep the pace moving and enough cryptic clues are available around to maintain interest. This is a first-rate game that easily beats earlier horror titles – play it in the dark!

9.5/10



GAME DETAILS

FOR: Absolutely dripping with spooky atmosphere; solid and clean interface; and great special effects.

AGAINST: Very slow character movement; some repetition of environments and gameplay; and sadly no sign of Casper the Friendly Ghost.

DEVELOPER: Tecmo www.tecmogames.com

PUBLISHER: Take2 Interactive www.take2games.com

DISTRIBUTOR: Take2 Interactive www.take2games.com

PHONE: Take2 Interactive (02) 9482 3455

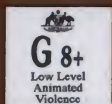
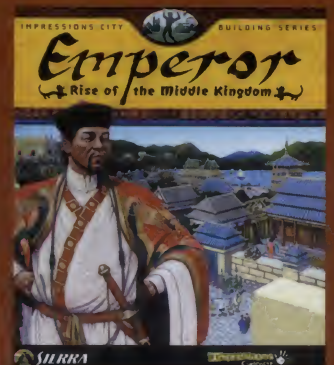
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with two buttons?"

B - A Ming Dynasty
toothpick?"

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Atomic 21 winner Panasonic e-wear: P Hine, Kulangoor QLD

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Your savior

In times of darkness, pain and sorrow, there is only one man who can turn your beeping mess of a PC into the beast you once worshipped. Daniel Rutter is his name. The lucky Aaron Kenah is Dan's favourite love child this month, so he will soon receive the ultimate gaming mouse, a Logitech Dual Optical Mouse (www.logitech.com.au).



i Cheap flat panel?

I'm a born again Atomician, and thanks to your magazine I'm now also a hardcore modder. I just bought a Triplex GeForce4 Ti4200 and was wondering how I could go about connecting a laptop display to the secondary display plug on my new card. I've looked online for the answer but can't seem to find it. I know that if this project were possible then it would generate quite a bit of interest, as laptop monitors are cheap and easy to come by.

Aaron Kenah

O This is a variation on the 'how do I connect a laptop display to plain old VGA' question, and the answer's much the same: you don't – unless you really want to pay more than you would for a basic boxed LCD monitor that's *made* to work with PCs.

The Digital Visual Interface (DVI) output from the second connector on your Ti4200, is, at least, *closer* to the digital data that the laptop panel wants, so you wouldn't need an analog-to-digital conversion stage in the driver hardware. But, still, no such driver hardware exists, at least not as an off-the-shelf product. You can't use the hardware from a toasted laptop – the source of many surplus laptop panels – because laptops don't bother producing a VGA or DVI signal to drive their panels.

There's no need for them to bother with that, when they only have to drive the one flavour of panel, with no cable to speak of between the video hardware and the display.

Sure, there's a VGA connector on the back of the laptop, but that won't help you.

Decent 15in flat panel monitors are getting down around the \$700 mark now, and if you want to go bargain-hunting you can find older, smaller and/or dodgier LCDs for quite a bit less. Unless you want to spend money on nothing, though, all a bare laptop panel is good for is replacing a busted laptop screen.

i Northwood burning?

Hi, I just recently built my first PC and was wondering if you could tell me what is the maximum temperature for the P4 1.8A GHz (Northwood) CPU? I read articles and messages posted up on the Web, and they say that P4 should be around 50°C max. . . however when I played some 3D games, it went up to 68°C. Is this normal?

Christopher Huynh

O Well, it isn't worryingly ABnormal, though it does suggest that your case ventilation might be lousy, or your CPU cooler might not be attached quite right. Don't have a cow over it, though.

Your processor's got a 67 degree Celsius 'maximum junction temperature'. That's not the point where the CPU will emit a little pop and die, but it *is* the temperature above which the CPU can reasonably be expected to get flaky.

However, the temperature your motherboard reports for the CPU is not necessarily the processor's actual core temperature. The P4 has an internal temperature sensor whose calibration ought to be pretty good. But the calibration of the motherboard hardware that connects to that sensor is unknown. Motherboard thermal readings are often inaccurate.

My standard hot-CPU's rule is this: don't worry if the computer ain't crashing. The P4 does have a built-in 'Thermal Monitor Feature' throttling mechanism that slows down its clock speed when the processor hits the maximum junction temperature.

It's easy enough to tell if your CPU's throttled down: a utility such as WCPUID www.h-oda.com should tell you what the CPU frequency is at any moment.

i His purpleness

I have been using an old Hitachi 22in monitor, and lately it hasn't been going so well. After booting up XP, it starts flickering between full colour and purple and then remains purple.

I'm wondering if there is anything that can be done about my sick Hitachi? I don't want to part with it just yet.

Warren

O I'll bet the 'purple' colour you're seeing is a magenta tint, caused by the green channel dropping out. Many monitors develop problems like this caused by plug or cable damage, or by a dud solder joint or failed component inside the monitor itself. Your problem sounds as if it's thermally triggered – something is probably expanding and losing contact as the monitor warms up.

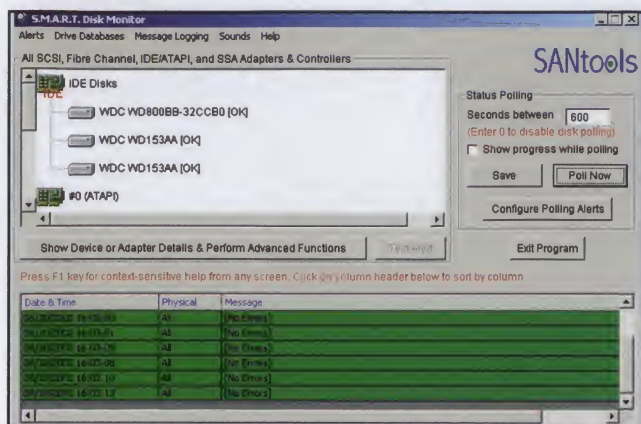
Lose green and your screen will be tinted magenta; lose red and it will be tinted cyan (blue-green); and lose blue and it will be tinted yellow.

Often, these problems can be solved with nothing but a bit of resoldering, but finding the spot that *needs* to be resoldered can be tricky. If it's a mere dud cable, and your monitor has a plug-in cable, then you can just change it.

i M56 SMART Drive

I consider myself to be fairly computer literate, but am intrigued by one setting on all motherboard BIOSes. What on earth is 'hard drive S.M.A.R.T. capability'? All the different mobos I've used have this setting, but none give any clues as to what it is.

Liz Braddon



ABOVE: How to hear what a SMART drive's saying

'SMART' stands for Self-Monitoring, Analysis and Reporting Technology: it's a standard for monitoring disk drive health and reporting problems. When the drive motors, media, or other components start behaving badly, SMART can warn you of an impending disk failure, so you can transfer your data over to a new drive before the old one carks it. SMART can't detect *everything* that can go wrong with a drive – it can't tell that you're about to kick your computer over on a tiled floor by accident – but it can notice a lot of failures before they happen. That's the theory, anyway.

Windows has supported SMART natively since Win98, but that doesn't mean it actually makes *use* of it. You have to run monitoring software that looks at the drive and tells you if anything seems to be amiss, or else the drive will be *doing* its SMART checking, but nothing will be asking it what it has found. Various all-in-one utility packages do SMART monitoring, and there are stand-alone monitors as well, such as SANTools' SMART Disk Monitor www.santools.com/smartmon.html.

i Pick a number. . .

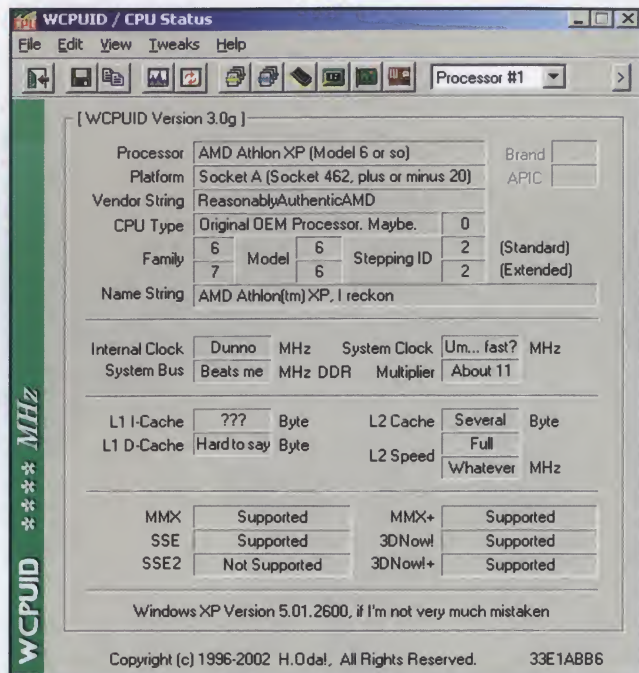
Two weeks ago I bought a new computer with an ASUS P4B533 motherboard and Pentium 4 2GHz processor. Needless to say I was going to overclock it, and I did, but during the process I faced one problem: I am getting reports of three different CPU core voltages, depending on where I look.

The BIOS and ASUS' PS Probe utilities are showing different CPU Voltage. (I have tried all available BIOS versions.)

For example, if I set Vcore to 1.625V in the BIOS setup, after saving settings and rebooting, the BIOS setup Power → Hardware Monitor display says 1.68V. But if I boot into Windows XP and run PC Probe, then it says Vcore is as high as 1.712V!

Who should I trust? Is it 1.625, 1.68 or 1.712? That's a big difference. If you don't know the exact Vcore, it's easy to damage the processor. I've read some articles on the Web where people said that Northwood core cannot be taken further than 1.7V.

Arthur



You should probably trust the BIOS Hardware Monitor display. If you're nervous about it, though, nothing short of hunting around the mobo with a thin and pointy multimeter probe will do.

The reason why the numbers vary is that different monitoring programs use different fudge factors. All hardware monitoring chips of a given model ought to act pretty much the same on the output side, assuming something isn't severely fouled up (their power supply, for instance). So, presented with the same input from a motherboard, a given hardware monitor chip should always give about the same voltage and temperature reading output.

Unfortunately, though, the *input* side of the hardware monitoring chip has components between it and the actual things it's measuring. The power rails are probably fed to the chip through a voltage-dropping resistor bridge, for instance, and the negative rails have an inverter between them and the chip.

These intervening components don't necessarily have the same values across all motherboards, and the mobo manufacturers take that into account when they set the compensation values for their BIOS setup software. Assuming they get it right – and they sometimes don't – the BIOS should therefore report accurate temperatures and voltages. You won't necessarily get the exact voltage you *asked* for, but the voltage the BIOS *reports* ought to be pretty much right. Other mobo monitoring software, though, may or may not get the fudge factors right for a given motherboard, and may therefore misreport both voltage and temperature.

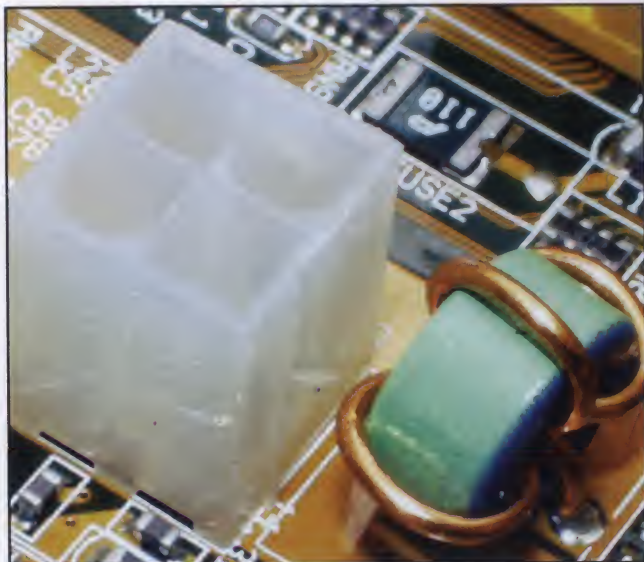
Fortunately, the thermal difference between Vcore values of 1.625V and 1.712V is only about 11% (CPU heat output increases linearly with core speed, but also with the square of the core voltage), and that's a pretty good measure of the amount of extra strain you're putting on your CPU if it is running at the higher voltage. So you're not likely to beat your processor to death as a result of these inaccuracies.

Yes, there have indeed been reports of Northwood cores working for a while at elevated Vcore before dying, but a core voltage difference of a few per cent shouldn't be enough to cause this problem. It might make it happen faster, but if that were the case, then it probably would have happened anyway.

i PSU plug plethora

I've noticed that some PSUs have the words 'Pentium 4 power connector' in their description. Do Pentium 4 motherboards require a special power connector?

Alan Chu



ABOVE: P4 power – if you don't use it, you're living dangerously.

Yes, they do, but it's not *just* a P4 thing. The extra connector is the 'ATX12V' plug and socket, a four-pin connector that provides two more 12V supply wires to the motherboard, along with a couple of grounds.

A motherboard with an ATX12V receptacle on it may work OK without the ATX12V connector plugged in. All these plugs do is provide more wires connecting the motherboard to the power rails. If you don't connect anything to the extra power inputs, then there'll be a more resistive path from the PSU to some of the components on the motherboard that need power, and so the voltage those components see may be too low.

Some motherboards have an ATX12V socket and also a regular four-pin 'Molex' power receptacle on the motherboard. You can plug a drive power connector into them instead of the ATX12V plug and they're happy. There are also cheap Molex-to-ATX12V adapter cables, which let you do the same trick with normal ATX12V mobs.

i Mystery plug

When changing my video card, I noticed that my old card had a 26-pin header on it, with no labels other than 'JP1'. I'm pretty sure that it's called a 'Feature Connector'. What features does it connect to?

Chris Holzworth

The VGA Feature Connector is a Video Electronics Standards Association (VESA) standard expansion connector for video cards. It was used for things like video overlay cards, TV tuner cards, head-mounted displays and so on. You hooked up the Feature Connector to another card in the computer with a little ribbon cable. The Feature Connector can only manage 256-colour video at lousy resolutions and it doesn't deliver a full video signal, just raw pixel values that have to be marshalled into an image with the help of data delivered by other means. Today, you'll find it filed under 'goodbye, and good riddance'.

i Hitting the wall

Why is it that newer hard disks beyond 32GBs don't work on some older motherboards?

My friend's Gigabyte 2000 Dual BIOS P3 mobo has this same problem with his 40GB disk: he needs to set the jumper to 32GB, so there goes 8GB wasted. . .

I run a K6-2 300MHz with a PC Chips mobo and have run into the same problem.

Jimmy Ly

Because 32 gigabytes should be enough for anyone.

Or, more helpfully, because the 32GB limit is just the latest of a string of hard drive size limits forced upon users by, among other things, address space restrictions.

Go back through the annals of PC history and you'll find limit lines at 32GB, 16GB, 8GB, 2GB and 540MB.

Some PCs that can't handle drives over 32GB can be cured with a BIOS update, some can be bludgeoned into compliance by using special software from the drive manufacturer, and some can't be fixed at all.

Fortunately, the Gigabyte GA-BX2000 and GA-BX2000+ seem to both be in the first category. The latest BIOS from <http://tw.giga-byte.com/support/intel440bx.htm> will, apparently, solve the problem. There are BIOS flashing instructions at <http://tw.giga-byte.com/support/bios.htm>

Your old PC Chips motherboard, on the other hand, probably can't be fixed.

i To swap or not to swap

If you are running Windows XP in a system that is sporting at least 500MB of RAM, do you think that it would perform better if you removed the swap file altogether? That might give me back a bit more hard drive space and maybe speed it up a bit.

Eric

Nope. When you have lots of physical RAM (ignoring hard drive virtual memory), and you're not actually using any more memory than the physical RAM you have, you'd think that the swap file would just be sitting there doing nothing.

What actually happens, though, is that applications tend to allocate more memory than they really need, just in case they suddenly do need it for some operation that you might perform. Applications are likely to actually use more than two thirds of the memory that they allocate, but the rest lies fallow.

Recent Windows flavours deal with this by assigning memory allocations to virtual memory at first, and assigning to physical RAM – assuming there's enough of it – only the memory that the application actually *uses*. This process doesn't cause disk flogging, because it's not really 'swapping' at all.

There's nothing in the virtual memory when it's re-assigned to physical memory. So if you have enough physical memory to handle all of the memory that's actually being used for something, you get to stay out of Swap File Hell, and the swap file just soaks up over-allocations and leaves more physical RAM for actual use.

The other reason not to disable or limit the size of your swap file is that doing so just gives you a point at which you'll get out-of-memory errors if the system *does* need to use more memory than it has physical RAM.

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- 1394 connectivity (option)



It's all in the BIOS

BIOS tweaking is only part of the story when it comes to maximising the performance of your motherboard. Ashton Mills says before one tweaks, one must first learn to hack!

Every Atomican knows the art of BIOS tweaking. It's key to squeezing extra performance out of your system by optimising RAM timings and bus speeds, to say nothing of overclocking. But you can only tweak what you can see, and some BIOSes sport far more tweakable options than they initially care to display.

There are two key advantages in hacking your own BIOS: you'll gain access to hidden settings, and you can replace BIOS components with your own – this enables you to boost the performance or feature set of your BIOS or, as we show you here, to insert your very own bootup logo!

This guide and the tools discussed focus on Award BIOSes, given their prominence in modern motherboards. If you have a name brand PC such as Dell you're out of luck, and if you have an AMI BIOS it's still possible to insert your own logo, but you'll need to Google for the appropriate tools.

What you need

1) A DOS boot disk Some of these BIOS hacking tools will work fine in a DOS box under Windows, but some don't and you most certainly *do not* want to try flashing a BIOS in Windows.

We're going to need every spare byte on a floppy to use one of the BIOS modding programs, so create a minimal boot floppy using Windows XP's format feature: right click on the floppy drive --> Format --> Create an MS-DOS startup disk.

Be sure to use a *new and reliable* floppy disk. You don't want to discover bad sectors the hard way through a botched flashing.

2) A BIOS If you're going to flash your mobo's BIOS you might as well flash fresh. Head on over to the homepage of your motherboard manufacturer and grab the latest BIOS image and flashing tool appropriate to your board. You can also use this as your backup BIOS.

3) BIOS tools The key programs we'll be using here are CBROM, MODBIN and EPACODER. The first two allow you to list, delete, add and modify BIOS components, while the latter is used to convert images to the correct format for BIOS logos.

All of these can be found at www.biosmods.com/download.php. Despite appearances CBROM 2.15 is newer than 6.06, so grab this, and for MODBIN grab version 1.00.38, not 2.0 Beta which doesn't handle many newer BIOSes. You'll find Epacoder 1.52 at the bottom of the Web page.

Massive disclaimer time: Unless you're using a DualBIOS Gigabyte board, chances are you only have one BIOS. If you fux it, you'll render your system lobotomised and you'll very likely need to send the board off to get a replacement BIOS. It may be possible to recover a BIOS if its boot block is still intact by creating a special BIOS boot floppy, but you'll need to contact the motherboard manufacturer as the process differs between manufacturers.

Atomic cannot be held liable for any damage you do to your system. Play at your own risk!

MODBIN

MODBIN allows you to directly edit the BIOS image to configure everything from the boot up message string to the BIOS menu tree and associated settings. MODBIN runs fine from a DOS prompt in Windows XP, but it can't save image files properly in the emulated environment. As a result you'll need to boot pure DOS before hacking at your BIOS with MODBIN.

If you have a FAT32 partition this is going to be a whole lot faster and easier. Simply copy the BIOS tools and your new BIOS to the FAT32 partition, boot your DOS disk, and work from there.

If your system is pure NTFS you'll need to work from the boot floppy, as DOS can't see NTFS drives. Because MODBIN extracts the BIOS into its component parts when you open an image and recombines them when you save, you'll need every ounce of space on the boot floppy for it to work.

Be warned, it will be *very* slow.

Browse the boot floppy that you made earlier and remove all the unnecessary files Windows XP copied across by deleting everything but COMMAND.COM, IO.SYS and MSDOS.SYS. This gives us a basic boot disk with just enough space for MODBIN to work with a single BIOS image.

Next, decompress the BIOS tools and the new BIOS from your motherboard manufacturer into a directory, open up a command prompt, `cd` to the directory, and type:

```
verify on
copy MODBIN6.exe awdf flash.exe [bios file].bin a:
```

The first command forces DOS to verify all writes, which we'll say is 'somewhat necessary' given the fickle nature of floppies. Windows Explorer does not verify, so you need to do this from a command prompt.

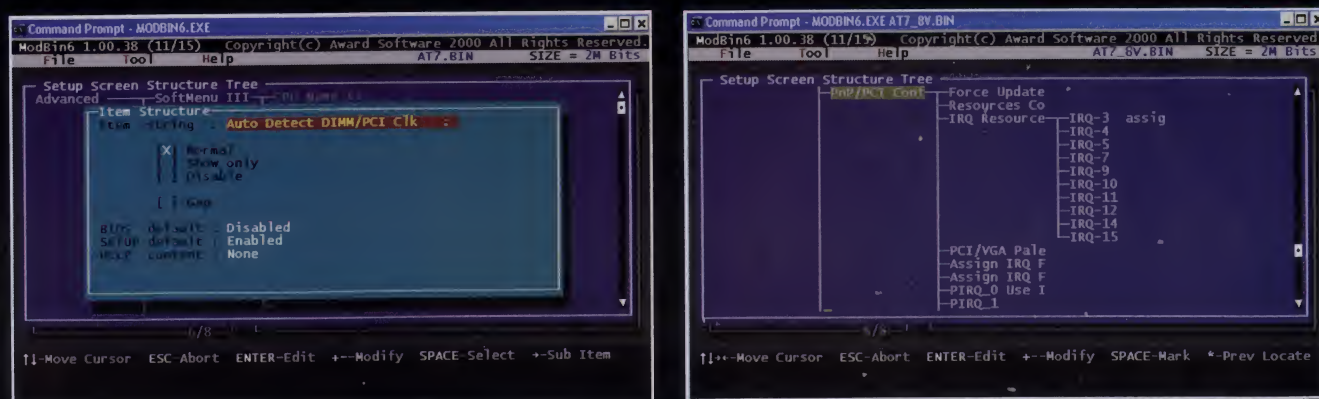


FIGURE 1: Modbin gives you absolute control over the configuration of your BIOS, from changing the boot up message to tailoring the menu tree and the BIOS options therein.

Note that if your BIOS image file doesn't feature a '.bin' extension, rename it before copying it across. Also the Award flash program may have a different name, or even be a different program, so it's important you use the one bundled by the motherboard manufacturer.

When you're ready boot the DOS disk, run **MODBIN6.exe**, select your BIOS image from the list, and grab a drink while it loads. Now we're ready to play!

DIY BIOS

MODBIN grants full access to the BIOS and its configuration. As usual when entering new domains, the following rule applies: if you don't understand it, leave it alone!

There are really only two sections we need concern ourselves with: Change BIOS Message and Edit Setup Screen.

The BIOS Message is, of course, the message displayed by the BIOS when it boots up. You can personalise your machine with your name and address as a deterrent to thieves or set something trendy like 'Welcome to the Matrix. . .', whatever lights your LEDs. Go wild!

Edit Setup Screen is the real meat of our project. This section allows you to browse the BIOS setup screens in a tree format, hiding or unhiding and setting default values for every option the BIOS supports.

What you're able to modify depends on the motherboard vendor. Of our two testbed machines the Gigabyte 7DXR BIOS revealed quite a few useful options that were hidden by default, such as the IDE prefetch mode, AGP latency timers and spread spectrum control. By contrast our ABIT AT7 BIOS already had all the power user settings visible (as you'd expect from ABIT!) and those options that were hidden, such as IDE block mode, were already set to their most beneficial setting.

See FIGURE 1

Speaking of which, as you explore you'll note that every option has a BIOS and Setup (failsafe and optimal) setting. So now, at last, you can see the difference between the two global configurations and what each one configures by default.

Note that if your Setup screen is a tree full of '?????' then you might want to try another version of MODBIN. Do not make any changes to a BIOS file and flash it if MODBIN can't properly read your Setup menu.

When you've made your changes save the modified BIOS, and go see a movie while the floppy whirrs away. Be patient, remember we said it'd be *slow*.

Flash me baby

If you're happy with your mods you can flash the BIOS from the a: drive, using the Award flash program, like so:

```
awdflash /py /an /cd /cp /cc [bios file].bin
```

Straight after flashing you should enter your BIOS and first restore BIOS defaults, followed by Setup defaults, and then be sure to run through and tweak your BIOS like you normally would.

CBROM

CBROM performs the deletion, addition or updating of BIOS modules. Modules include not just the system's BIOS but also the ACPI table, onboard controller BIOSes, and of course those ugly Energy Saver logos.

CBROM can be especially handy for onboard peripherals such as IDE/SCSI ATA/RAID controllers – when manufacturers release updated BIOSes they usually do so only for their ranges of plug-in PCI cards. If you want to take advantage of the updated BIOS for your motherboard's controller you'll have to wait until the motherboard manufacturer releases an updated motherboard BIOS that includes it, if it does so at all.

For example, a popular hack is to transform the 'lite' Promise RAID controllers found on some motherboards into fully-fledged RAID controllers by simply inserting the full RAID BIOS in place of the crippled one. Simply grab the ATA and RAID controller BIOSes for the plug-in PCI cards that use the same controller as your motherboard (eg. the Ultra100 and FastTrack100 series for motherboards using the 20265 controller) and insert them in place of the 'lite' BIOSes using CBROM.

Unlike MODBIN we can use CBROM just fine from a command line in Windows XP. Working with the AT7 BIOS we can list the contents of the BIOS image as follows:

```
CBROM215 at7_8v.bin /l
```

At the time of writing Highpoint recently released a new 1.22 BIOS for its HPT374 controller found on RocketRaid 404s and in motherboards, for example, like the AT7. We can't use the Highpoint flashing tool, as it's designed for plug-in PCI cards, but we can take the 1.22 BIOS from the archive and replace the old 1.21 version in the AT7's BIOS like so:

```
CBROM215 at7_8v.bin /pci bios374.122
```

And then it's just a matter of copying the BIOS to the boot floppy and flashing away. You make use of CBROM before or after your changes with MODBIN – just make sure you're hacking the same file.

For more information on what type of BIOS modules are out there you can Google it, or search some of the hardcore discussion sites for BIOS modding topics. Be careful when replacing BIOS modules, because if you insert modules not designed for the motherboard hardware you may not have the opportunity to get back in and fix your mistake. Unless of course you're one of those people with a fancy dual BIOS motherboard.

See FIGURE 2 and FIGURE 3

'MODBIN grants full access to the BIOS and its configuration. As usual, the following rule applies: if you don't understand it, leave it alone!'

***** at7_8v.bin BIOS component *****			
No.	Item-Name	Original-Size	Compressed-Size Original-File-Name
0.	System BIOS	20000h(128.00K)	12E0fh(75.51K) AT7_8V.BIN
1.	XGROUP CODE	08360h(44.84K)	07CDEh(31.22K) awardext.rom
2.	ACPI table	03486h(13.13K)	0148bh(5.14K) ACPItbl.BIN
3.	EPA LOGO	00642h(1.56K)	00228h(0.54K) AWARDEPA.BIN
4.	YGROUP ROM	03F70h(15.86K)	02A33h(10.55K) awardext.rom
5.	GROUP ROM[0]	03680h(13.62K)	01A2Eh(6.54K) _EN_CODE.BIN
6.	PCI ROM[A]	0E000h(56.00K)	06EE8h(27.73K) bios374.121
7.	PCI ROM[B]	0D000h(52.00K)	07C3Ch(31.06K) rtsrom_m.1om
Total compress code space = 34000h(208.00K)			
Total compressed code size = 2F128h(188.29K)			
Remain compress code space = 04ED8h(19.71K)			

FIGURE 2: The AT7 version 8V BIOS fresh from ABIT's Taiwanese Website
Note the current Highpoint 1.21 BIOS and the EPA logo file

***** at7_8v.bin BIOS component *****			
No.	Item-Name	Original Size	Compressed Size Original File Name
0.	System BIOS	20000h(128.00K)	12E0fh(75.51K) AT7_8V.BIN
1.	XGROUP CODE	08360h(44.84K)	07CDEh(31.22K) awardext.rom
2.	ACPI table	03486h(13.13K)	0148bh(5.14K) ACPItbl.BIN
3.	YGROUP ROM	03F70h(15.86K)	02A33h(10.55K) awardext.rom
4.	GROUP ROM[0]	03680h(13.62K)	01A2Eh(6.54K) _EN_CODE.BIN
5.	PCI ROM[B]	0D000h(52.00K)	07C3Ch(31.06K) rtsrom_m.1om
6.	PCI ROM[A]	0E000h(56.00K)	0700Ah(28.03K) bios374.122
7.	EPA LOGO	00642h(1.56K)	002CDh(0.70K) atomic.bin
Total compress code space = 34000h(208.00K)			
Total compressed code size = 2F2ECh(188.73K)			
Remain compress code space = 04D14h(19.27K)			

FIGURE 3: The AT7 8V BIOS after our changes. Note the Atomic logo file and the new 1.22 Highpoint BIOS

'Firing up paint and calling on the artistic talents of Katie Kate our designer, we mock up an uber-cool *Atomic* logo. It helps to use a reliable graphics tool such as Paint Shop Pro or The Gimp.'

Luscious logos

Now for a purely aesthetic hack. Everyone disables those annoying manufacturer or Energy Star Alliance (EPA) logos because, frankly, they suck. So what about replacing them with your own? Easily done!

You'll note in the display of BIOS modules earlier that there's a module called EPALOGO.BIN. The name may differ between BIOSes, but the file serves the same purpose. Replace this and you replace the startup logo.

EPA logo files use their own format, and just to confuse things there are currently two versions of the format each of which provides different specifications. Essentially images must conform to the following:

- Be 136 x 84 or 136 x 126 in size
- Use a 4-bit (16 colour) palette
- No more than two colours can be present in a cell (for version 1)

The last bit needs a little explanation. A version 1 EPA 136x84 image is divided into 17 x 6 cells, and in each cell no more than two colours can be present *and this includes the background!* The version 2 format isn't quite so restricted, but even so if you're thinking of being the next Michelangelo of BIOS logos you don't have a lot to work with. So how to tell which format to use for your BIOS? The easiest way is to extract the logo from your current BIOS and run it through Epacoder, the handy tool that lets us convert BMP images to EPA format, to get the EPA version and dimensions.

Hacking away on our ABIT AT7 as we are, we start by extracting the current logo:

```
CBROM215 at7_8v.bin /epa extract
```

Note that regardless of extension - .bin, .bmp or .epa - the file will always be an EPA format image. Also note that for BIOSes that use more than one logo you can also easily extract and replace these as well. Loading up the 'awardepa.bin' file in Epacoder we find that it's a version 1 format image using the standard 136 x 84 dimensions. Firing up Paint and calling on the artistic talents of Katie Kate our designer, we mock up an uber-cool *Atomic* logo.

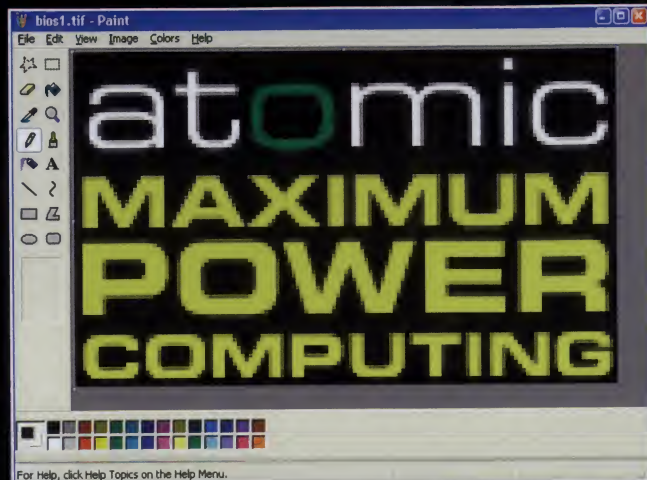
It helps, of course, to use a reliable graphics tool such as Paint Shop Pro under Windows or The Gimp under Linux but even humble MS Paint will do the job in a jiffy - simply drag the starting canvas to equal the correct dimensions, paint away, and be sure to save the file as a 16-colour BMP.

Now all we need to do is load it up in Epacoder, select version 1 for the format because that's what the AT7 BIOS expects, and click the BMP --> EPA button. Epacoder will tell you if it can't convert the image, for example if you're using a larger than 4-bit colour palette or if more than two colours exist in a cell. If the latter is a problem, turn on the overlay grid to see where more than two colours exist in a cell.

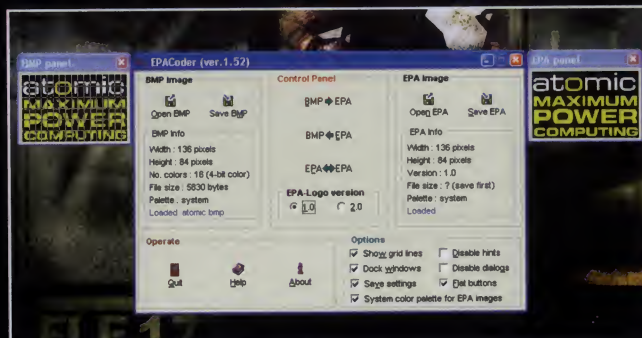
If Epacoder is happy save your image filename in 8.3 format with the same file extension as the one you extracted, and insert it using CBROM:

```
CBROM215 at7_8v.bin /epa atomic.bmp
```

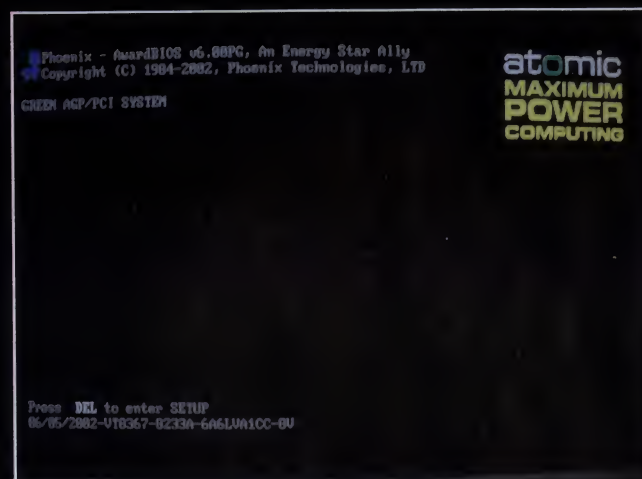
Then, as before, it's just a matter of flashing the new BIOS and making sure the option to display the logo is turned on in the BIOS. If you want to use the official *Atomic* BIOS logo for your boxen, head on over to www.atomicmpc.com.au/downloads.php. Alternatively Google 'EPA logos' and you'll find a number of online galleries.



ABOVE: The *Atomic* EPA logo in process in MS Paint. In order to comply with the EPA format we had to convert the image to monochrome and then colour it ourselves.



ABOVE: Epacoder is the essential magic tool that makes it possible to convert BMP images into the required EPA logo format. The program is also essential in determining which EPA logo format your BIOS uses by loading an EPA logo extracted from the BIOS.



ABOVE: The bootup of our BIOS hacked system. *Atomic* owns your POST screen - look at all those purdy colours.

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The Uber-Linux box project Pt3

You have a file server, caching gateway, firewall, and locally generated netstats. But your Tux Box is barely being taxed. In this month's sometime's easy-to-follow tutorial, Ashton Mills shows you how to add networked applications, distributed computing and game serving to its arsenal!

In this month's tutorial we're going to focus on putting your Uber Box to work. For the most part its CPU cycles are running idle, and it's probably getting bored just shuffling packets around.

If your Uber Box was designed primarily to be a gateway, and sports only a low end CPU and no more than 64MB of RAM, parts of this month's tutorial may be out of reach for your little penguin (such as game serving). Each topic is covered separately, however, so you can add each feature as you see fit.

First up this month we'll do a little housekeeping.

Security is a habit

Even though you have a firewall protecting your network, it's still wise to ensure no services are unnecessarily listening on ports connected to the outside world. Security is as much about habit as it is about knowledge, so we'll start by getting in the habit of binding.

Binding

Last month we bound Squid to the internal eth1 network address when we set it up. We can also bind Webmin, Samba and Apache – the servers we've enabled over the last two tutorials – to the internal network.

(1) Login to your box as root via Webmin, [https://\[Linux box IP\]:10000](https://[Linux box IP]:10000)

(2) Click Webmin Configuration → Port and Address, then select the empty box and type in your server's IP. Click Save and Webmin will be bound internally.

(3) Next click Servers → Samba Windows File Sharing → Unix Networking. Under Network Interfaces select 'Use list...' and type in your Linux box IP followed by a netmask of 255.255.255.0. Click Save and Samba will be bound.

(4) If you are using MRTG for the locally generated netstats, the Apache Web server will be running. Click Servers → Apache Webserver → Networking and Addresses. In place of the selection 'All' click the empty boxes and type in your server's IP for the two ports listed, then click Save.

(5) As an exercise in administration we'll login to restart the services, but using Webmin to do so. Webmin features a Java Telnet client you'll find in Others →

Telnet/SSH Login. Once logged in `su` to root and run:

```
service webmin restart
service smb restart
service httpd restart
```

SSH

Even though the firewall blocks the Telnet port we'll disable the insecure protocol in favour of SSH, the Secure SHell, because again security is a matter of habit. Additionally, the Windows Telnet client sucks immensely so if you're going to download a new one you might as well take advantage of SSH.

Head on over to www.chiark.greenend.org.uk/~sgtatham/putty or a Windows file archive like Tucows, and grab Putty saving directly to your desktop. Putty is an excellent Windows Telnet and SSH client that properly supports terminal emulation – ie. keys will work as you expect in programs (such as Backspace actually deleting in Jed) and console applications, such as the text mode Web browser `lynx`, will render properly.

Before we run Putty let's login and disable Telnet on the server. Open up a command prompt in Windows and run:

(1) `telnet [server IP]` then `su` to root.

(2) Next we make sure the SSH daemon is running so that when we disable the Telnet service we'll be able to login with SSH: `service sshd start`.

(3) Run `drakxservices`, deselect 'telnet' and check 'sshd' is selected.

(4) When you hit 'OK' you will, of course, lose your connection to the server as Telnet is cut off.

(5) Now we'll use Putty to SSH into the box. Run Putty and you'll be prompted to type in a destination IP. Type in the

Uber Box's IP address and then click 'SSH' underneath – you'll note the port changes from port 23 (Telnet) to 22 (SSH). Simply click 'Open' to connect.

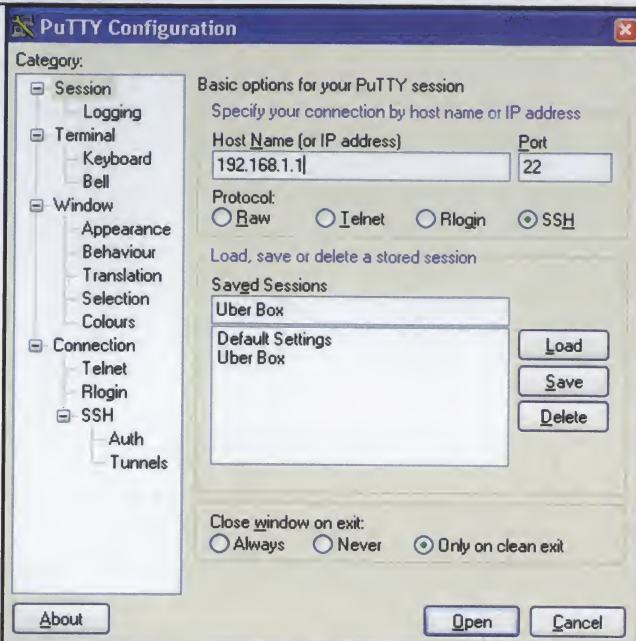
The first time you SSH to a box you'll be prompted to create a new key for the machine, select Yes. You can then login as any user, including root if you wish (with an encrypted SSH stream it's considered safe enough to do so).

Uber note: Explore the Putty options and set a nicer font such as Lucida if you plan to use the terminal frequently. In addition to properly mapping keys you'll note that when the

Putty window is resized the contents inside adjust automatically.

This is how a terminal is supposed to behave!





ABOVE: Putty is a full-featured Telnet client for Windows that supports SSH, compression and X11 forwarding.

Opening doors

You now have a reliable and secure gateway and firewall server for your home. What about those times when you wish you could login to your baby remotely from another location (like a LAN day!) over the Internet? No problem – the SSH daemon is already running so all you need to do is open up port 22, SSH, in the firewall:

(1) `jed /etc/atomic.firewall`

(2) At the start of the INPUT chain section add the following:
`$IPTABLES -A INPUT -p tcp --dport 22 -j ACCEPT`

(3) Save and then reload the firewall by running:
`/etc/atomic.firewall`

You could also, of course, unbind Webmin back to listening on both `eth1` and `eth0` and then open up port 10000 on the wall to allow you to manage your system via Webmin from anywhere in the world. Given this is the standard port for Webmin, and thus a port crackers will test to be open, it'd be wise to set a different listening port in Webmin and open that port in the firewall.

We've been doing a lot of work from the humble command line, but what about taking advantage of the graphical programs in Mandrake? Strap on your boogie boots – it's time for some X!

The joy of X

The X Window System, despite all visually appealing appearances, is in fact a network protocol. Ever since its inception back in the mid-1980s X was designed to display applications not just locally but to any machine on a network, across the room or across the world.

It does this by dividing the graphical service into two components: the X server and the X client. The X server is the program that drives your video card and actually creates the

ability for graphics to display on your monitor, but doesn't, on its own, provide a graphical environment. X clients are any graphical programs that display their output via the X server.

A program will by default send its graphical output to the local X server for display – but you can just as easily tell a program to send its display to a remote X server instead.

On our Uber Box we elected to *not* start the XFree86 (the version of X that Linux uses) X server during installation as this is a waste of resources for a headless machine. We don't need an X server running in order to display programs on a remote desktop machine over the network – all we need, of course, is an X server running on the desktop machine. Applications can then be told to send their display to a remote, rather than a local, X server.

Remote X

We'll start by showing you how to do this on a Linux desktop, as it's quick and easy and you'll be able to see how the concept applies when it comes to doing it under Windows.

With Linux as a desktop machine, the X server is already running. There are just two steps to starting an application on the Uber server that sends its display over the network to a Linux desktop machine.

(1) Like any other network protocol, the X service could easily be abused if it's not restricted. By default a Linux box will not allow remote connections to its X server. So first we tell the desktop machine to accept connections from the server box.

Assuming the server box has an IP of 192.168.1.1, from a terminal on the desktop we run: `xhost +192.168.1.1`

(2) Now we simply `telnet` or `ssh` into the server box and run an application, appending the `-display` switch that tells the program to send its display to a remote X server. If 192.168.1.25 is our Linux desktop:

```
mozilla --display 192.168.1.25:0
```

Pft to naysayers that say Linux is hard!

But what's this `:0` bit at the end there, is that a port? Nope, but it is a *display*. Linux is capable of running multiple displays (think separate collection of monitors) and each display can have multiple *screens* (think individual monitors in a collection). You can direct a program's output directly to a specific screen on a specific display using the format `[machine]:[display].[screen]`. This sort of versatility allows mainframes to serve graphical desktops, multi-monitor if need be, locally and to hundreds of users over a network. Guess what? Your humble Uber Box can do this as well

Windows X Windows

If all we need to have Linux applications display on our local desktop is an X server, does that mean if we run an X server under Windows we can take advantage of the graphical Linux applications on the Uber Box? Aye!

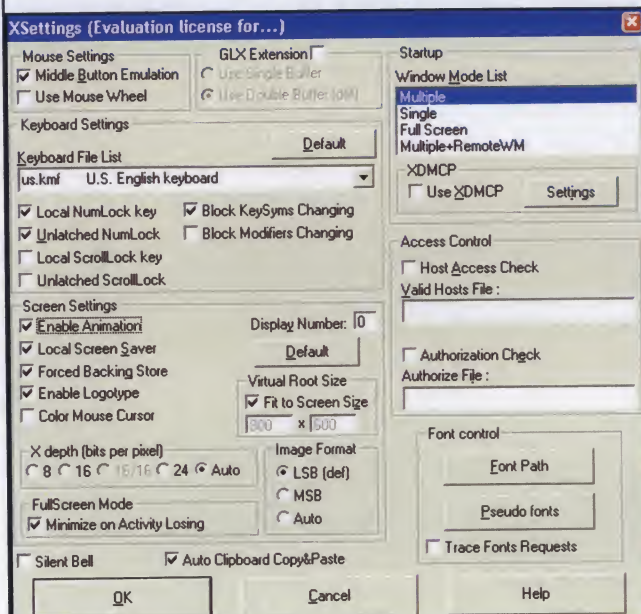
There are quite a few Windows X servers available, but they differ in the level of support they offer and, like most Windows software, generally cost money.

Two of the more popular options are X-Win32 and WinaXe. We'll go with WinaXe because it's easy to set up and comes with an unlimited trial in 30-minute usage periods – handy if all you want to do is run an application occasionally to manage your system. It's also one of the cheapest Windows X servers available if you decide to buy one.

You can grab the WinaXe trial version from www.labf.com/download.

(1) After installing WinaXe navigate through your Start menu to the WinaXe folder and run 'XSettings'.

(2) The defaults are mostly fine, just select 'Enable Animation' and 'Forced Backing Store' under Screen Settings, and then select 'Auto' under X Depth. If you have a mouse wheel enable it under Mouse Settings. Click OK when you're done. Note that you don't have to worry about authorising connections as with Linux – the Windows X server allows connections by default because, of course, that's the very reason it's been installed.



ABOVE: Configuring WinaXe, an X server for Windows. Note just how simple it all is to work with.

(3) Navigate to the WinaXe folder again and this time run 'XSession'. A splash screen will appear and WinaXe will seemingly minimise to your taskbar, but rest assured you now have an X server running.

(4) Start up Putty, SSH into your box, and run:

```
mozilla --display [Windows box IP]:0 &
```

And say hello to Mozilla running on your server box! If Mozilla is too beefy for your humble hardware, try running something simple such as `gcalc` or `kedit` as a test.

Speaking of which, if you've had enough of this old fangled command line gig, you can use `kedit` as a text editor from now on in place of `jed`, as long as you are running an X server.

It's time to introduce you to another feature of the command line, one that is arguably one of the nicest features of any Unix or Unix-like OS: background processing. The '&'

character at the end of the above command tells Linux to run the process in the background, thereby returning control of the terminal session back to you. If you run Mozilla without appending the '&' character, you'll note you can no longer use the terminal session until Mozilla finishes running.

Backgrounding allows us to run a variety of programs from the same terminal. However, if you plan to run a number of applications in a session, you can automate the process of directing programs to display on your Windows box by telling Linux to redirect all output using the DISPLAY environment variable:

```
export DISPLAY= 192.168.1.25:0
mozilla &
drakxservices &
```

Alternatively you can take advantage of SSH's ability to forward the X protocol. If you explore the Putty options under Connections -> SSH -> Tunnels you'll find an option called 'X11 Forwarding'. If you enable this before clicking 'Open' the Putty session will automatically forward the X protocol to your waiting X server, bypassing the need to use the DISPLAY environment variable or the '-display' switch with programs you run. Tres cool.

Additionally you'll find under Connections -> SSH the option to enable compression – this won't do much on your LAN but if you use Putty (or any other SSH client) to connect to your box from another location, compression will help responsiveness (especially if running X applications over the Web).

Next month we'll show you how to run a full screen desktop over the network, and this will give you a great opportunity to explore all the graphical programs bundled with Mandrake.

Uber updating

It's time we upgraded the Uber Box to the latest fixes and updates for Mandrake Linux 8.2.

(1) Start WinaXe, SSH into your Linux box with Putty, and then run:

```
export DISPLAY= [Windows box IP]:0
MandrakeUpdate &
```

As always, commands are case sensitive. It's important we export the DISPLAY variable here because `MandrakeUpdate` will call other graphical programs which won't know to send their display to our Windows box unless we make it a global setting using the DISPLAY environment variable.

(2) The first time you run the program it'll prompt you to select a source for security updates, select Yes.

(3) On the next screen click 'Update list of mirrors' and then select a mirror from the dropdown box. The first entry 'mirrors.secsup.org' should do fine. It may take a while to download the update list, even on broadband, so you'll need to be patient.

When it has finished adding the source for security updates a list of all the sources, which include the original Mandrake CDs, will be displayed. Just click OK.

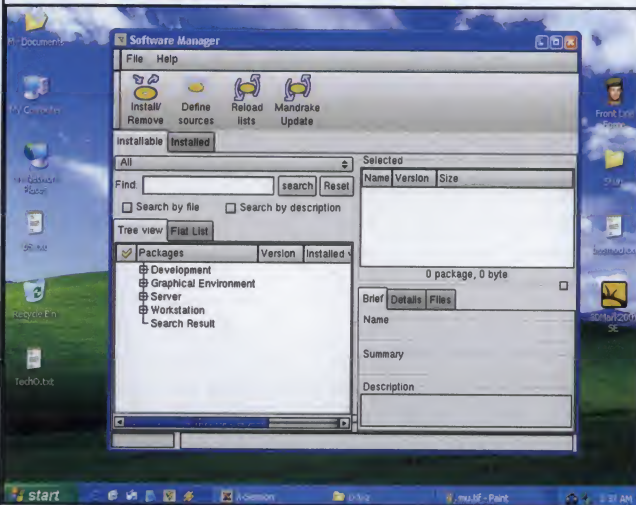
'Note that you don't have to worry about authorising connections as with Linux – the Windows X server allows connections by default because, of course, that's the very reason it's been installed.'

Click Next to update your system and note how you *don't* have to reboot!

(4) The update wizard will then display. Click Next and then select all of Bugfixes, Normal updates and Security updates before clicking Next again.

(5) From here you can select from the updates available. You don't need to update everything, just select the following core services we've been using (note any dependencies will be selected for you): apache, openssh, openssh-server, squid, webmin, xinetd.

Click Next to update your system and, once again, note how you *don't* have to reboot for the changes to take effect! Ah, life is good. . .



ABOVE: The Mandrake Update tool with the Gnome theme – Linux applications on the Windows desktop!

Uber monitoring

We can always explore `/proc` in a terminal to see what our server box is up to, but what about having the current state of the system always on display on your Windows desktop?

For this we will make use of the popular system monitoring tool `gkrellm`.

(1) While still SSHed into your Uber server throw in CD2 of Mandrake 8.2 and run:

```
mount /mnt/cdrom
rpm -ivh /mnt/cdrom/Mandrake/RPMS2/gkrellm*
```

(2) After `gkrellm` is installed eject `/mnt/cdrom` and then type:

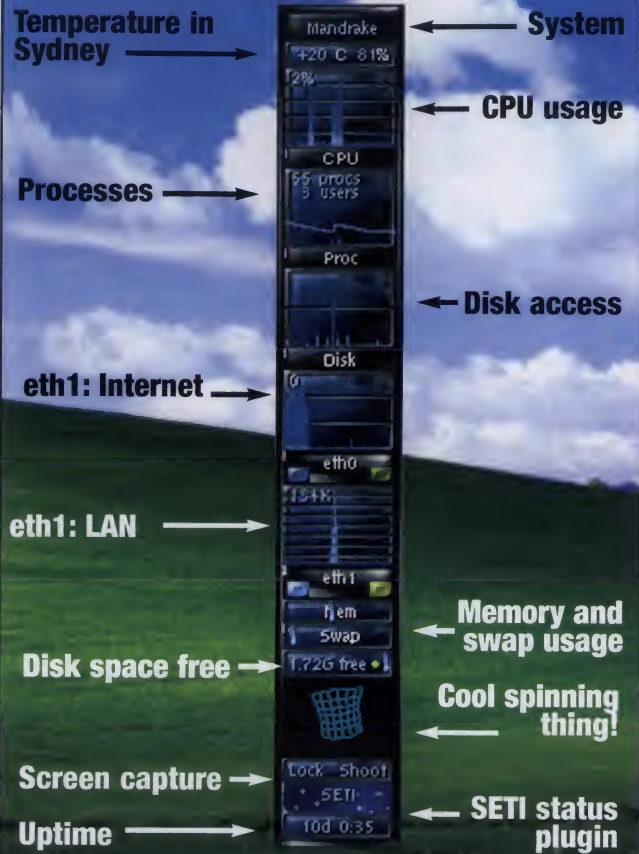
```
gkrellm --display [Windows box IP]:0 &
```

(3) Right click on the top menu and configure `gkrellm` to your liking, including tailoring the look with a variety of themes.

More themes and plugins can be downloaded from the Web.

Note that `gkrellm` will save a configuration file for each user, so if you configure it while logged in as root you'll need to run it as root to use the same configuration.

If you want to automate the process of launching a program like `gkrellm` grab the program `Plink` from the Putty homepage, create a new shortcut, select to run it minimised, and then for the target enter: `[path to plink]\plink.exe -ssh [user]@[Linux box] -pw [pass] gkrellm --display [Windows box]:0`.



ABOVE: Monitoring the Uber Linux box gateway with `gkrellm`. Everything useful is included, provided it spins, or can be graphed in real time.

Uber note: The poor man's `gkrellm` is the ever viable `top` which you can run directly from the command line. If you have lots of memory and it says very little is free, fret not for if you look at the 'cached' line at the top right you'll see a fair amount is soaked up in the dynamic disk cache, which will be re-allocated to programs on demand. Press 'q' to quit `top`.

Distributed computing

Uber though your box may be, a busy box it isn't.

Forwarding and firewalling packets takes minimal CPU resources, which means, for the most part, your box is doing nothing. A box, we might add, that is permanently connected to the Internet. What a perfect candidate for some distributed computing action!

There are a variety of distributed computing projects you can choose to donate your Uber Box's CPU cycles to, but we will show you how to set up SETI simply because it is just plain cool.

(1) Surf to setiathome.ssl.berkeley.edu and download the Linux command-line client. Grab either the i386 binary or, if you have a Pentium Pro or above system, the i686 binary. Be sure to snarf the GNU Libc 2.1 version for whichever one you use.

(2) Assuming you've saved to your shared directory on the server (/home/storage if you've been following the tutorials), SSH into the box and set up SETI like so:

```
mkdir /home/seti
cd /home/seti
tar -xvf /home/storage/seti[TAB]
```

Note there's no 'z' in the switch for `tar`, because the SETI archive is not gzipped.

(3) SETI will be extracted into a long 'setiathome-blahblah' directory, so we'll move the files from there to our current directory to make the executable easier to reference when we call it:

```
mv seti[TAB]/* .
rm -rf setiathome-[TAB]
```

The first line uses simply '.' to refer to the current directory, and for the second line you'll need to type out 'setiathome-' before pressing TAB as the TAB key will first match the name of the executable 'setiathome' we just moved to the current directory.

(4) Start SETI at the command prompt like so:

```
./setiathome -nice 15
```

Note the './' attached to the command which is required to run it from the current directory.

The first time you run SETI you'll be prompted to create a new account or use an existing one, follow the prompts accordingly until you see SETI download a work unit and start crunching away.

The 'nice' switch tells SETI to run, well, *nicely*. Even though '-15' ensures it will stay out of the way and won't suck CPU power from any processes that require it, it will still happily jump in and make use of spare CPU cycles even while running a game sever (when the server is idle or not fully loaded, for example). The SETI client really is a fire-and-forget program that you won't even know is running.

Now we'll make sure the client runs at bootup and whenever it quits itself (such as when the SETI servers are unavailable) by running it as a Cron job every hour. The easiest way is to edit the /etc/crontab file as the SETI installation instructions recommend. First quit the client by pressing Ctrl-C - don't worry it'll pickup where it left off when it runs again - then run `jed /etc/crontab`. Add the following to the end of the file:

```
01 * * * * root cd /home/seti; ./setiathome -
nice 15 &
```

If the client isn't already running, it will start up again on the hour. You can monitor your progress by visiting setiathome.ssl.berkeley.edu online (be sure to join the ATOMICMPC group! You'll find our Uber Box powering away under 'Martigen'). Alternatively check out 'HTMLPeriSETI' on www.freshmeat.net for an excellent HTML front-end you can browse via Apache.

Gaming tux

The popularity of Linux as server platform applies not just to big beefy business tasks, but also to the glorious realm of games. While game developers rarely release clients for the Linux desktop, they quite often release Linux servers.

Of all the additions to your Uber Box, running a game server is going to be the most demanding.

You'll want your box to have at least a 300MHz CPU and while you can probably get away with 64MB, obviously

128MB or more would be better.

Whatever you have, don't fret about the other tasks your box is doing - it will happily continue to share files, forward and firewall packets, and run SETI very nicely without missing a beat.

There are Linux servers for a whole swag of games available, including DoD, JK2, SOF2, NWN, FLF and more. However as Counter-Strike is uber-popular we'll show you how to set up a Counter-Strike server. Go go go!

(1) Head on over to www.ausgamers.com or www.fileplanet.com and grab the latest Half-Life and CS Linux servers, downloading to your shared directory on the Linux box. At the time of writing this is 3110 for Half-Life and 1.5 for CS.

Uber note: If the full Half-Life server you downloaded comes with a '.bin' extension this is the self-extracting Valve file that requires you to read its EULA. First `cd /home/storage` and run the file as follows: `./hlds_1_3110_full.bin`.

It should already be an executable file but if it's not you can make it so with `chmod +x [file]`. Delete the .bin file afterwards to free up 100MB.

(2) SSH into your box, `su` to root, and then do the following:

```
cd /usr/local/games
tar -zxvf
/home/storage/hlds_1_3110_full.tar.gz
tar -zxvf /home/storage/cs_15_full.tar.gz -C
hlds_1
```

Don't forget to use the TAB key to use auto completion. Note the '-C hlds_1' switch on the second extraction line tells `tar` to extract into the directory the Half-Life server created.

(3) Now we can change to the Half-Life server directory and start the server like so:

```
cd hlds_1
./hlds_run -game cstrike +maxplayers 10 +map
cs_assault +sv_lan 1 -nomaster
```

Of course, it helps to have some people to play with. If you want to temporarily host a server for your mates to connect to from the Internet, do the following:

(1) First, open up the Half-Life port in the Atomic Firewall (just run this straight from the command line):

```
iptables -A INPUT -p udp --dport 27015 -j ACCEPT
```

To remove this rule later simply rerun

```
/etc/atomic.firewall.
```

(2) Run `ifconfig` to see the IP address your gateway is using on the Net (eth0).

(3) Run the Counter-Strike server with your IP and without the LAN switches like so:

```
./hlds_run -game cstrike +ip [your IP]
+maxplayers 10 +map cs_assault
```

You can then use the 'status' command in the Half-Life server to check it's running on the correct IP, and 'quit' to exit the server. If you start it backgrounded you'll need to terminate it with `killall hlds*`.

Don't forget to use `top` and `gkrellm` to monitor systems resources while it's running.

Due to popular demand we'll be continuing the tutorial to a fourth part next month where we'll cover running full Linux desktops across the network and the wonders of the Linux kernel!

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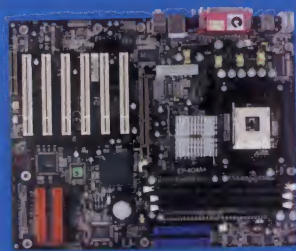
www.thethinggames.com

I wanna be free

EPoX 4G4A+

This Pentium 4 motherboard won the Hot award in *Atomic 21's* roundup, making it the dream board for overclockers. Until something better comes along, anyway. Using this baby, we got a Northwood 1.6GHz P4 up to a far more useful 2.56GHz. The 4G4A+ is chokka with features and is the only P4 board we've seen that doesn't need the bothersome ATX 12V power connector, meaning that you won't need a new PSU. Neat huh? So now, if you wanted to, hypothetically, you could swap from an Athlon system to a Pentium 4 system without needing a new case or PSU. Some people are like that.

EPoX in Taiwan donated this board, and you can go to www.westan.com.au if you want one for yourself, unless you win this comp, in which case you'll be happier with your new mobo.
Q: What was the name of the singing cowboy's horse?



Zalman video cooler

The ZM80-HP is reviewed on page 58 of this very issue, and what a strange thing it is. Designed for quiet operation, its fanless design is unique for a video card cooler.

In testing it proved to be the real deal.

While you won't get much of an overclock, that isn't the point. You'll instead get a nice quiet case, with the nastiest looking lump of Aluminium you could ever hope to install inside your case. If the winner wants to mod this sucker with a fan and really exploit science, then, send us pics and overclocking results and we'll make you famous!

Mucho thanks to the people at PC Case Gear (www.pccasegear.com.au) for giving us this nice prize.

Q: What was the name of the magic arcade machine in the film Big?



Altech case and RAM

Want a totally killer case? The 1080AMG from Altech is the one.

Designed as a server case, but happy to take an ATX board, this beast is metallic grey and looks fearsome.

Sporting a TruePower 430W PSU, side panel grill with fan, two front USB ports and one front Firewire port, as well as four 80 mm fans, it undoubtedly rocks fully hard.

It would almost be a crime to mod a thing like this, but if one were so inclined, something quite remarkable could be created.

Altech has also chucked in a stick of 256MB DDR RAM CAS2 XMS3200, because it's so tops.

Check out its wares at www.altech.com.au, or call the company sometime soon on (02) 9735 5655.

Q: How do we know the universe is expanding?



Heavy Water winner

The most beautiful thing ever created, the *Atomic Heavy Water Project*, has an owner.

Congratulations T Pring, of Parramatta NSW! Q & As:

Q: What was the name of the WWII movie about the Allies' sabotage of the German nuclear weapons project?

A: The Heroes of Telemark.

Q: An event important to case modding happened in 1933 at the Rohm & Haas Laboratories, in Darmstadt, Germany. What was it?

A: The first polymerisation of Perspex occurred.

Q: What are the only two naturally occurring isotopes of Aluminium?

A: 26Al and 27Al.

Q: Despite the warm growth environment that a water-cooling system provides, why should you avoid using algacide in the water?

A: Algacide is salt based and causes corrosion of the water-cooling system.



Email entries to win@atomicmpc.com.au or post them to: *Atomic*, PO Box 275, Beaconsfield NSW 2014. Please send a separate entry for each competition. Please ensure the competition name is the subject of the email, or is displayed clearly on the front of the envelope. The closing date for entries is 20 November 2002. Winners will be announced in *Atomic 24*.

Atomic 20 winners: ATI RADEON 9000: Q. Who invented the electrically heated toilet seat? A. John Clive Douglas in 1960. D. Lacey, email. JNX SSF-886B: Q. What unusual item does Blink 182 request as part of the band's backstage dressing room requirements? A. Polaroid film. M. Walker, Prospect SA. Getting Medieval: Q. What medieval ailment did Cocks Stones relieve, and what's the main ingredient? A. Testicles of the Rooster. They

refresh and restore such bodies as have been wasted by long sickness, help such as are weak in the sports of Venus. R. Stein, Kenmore QLD; J. Manning, Gorokan NSW; B. Bank, Yeronga QLD. Dacal CD Library: Q. What is the full name of Fonzie's stunt driving girlfriend and what was her band's name? A. Fonzie's girlfriend's full name is Pinkie Tuscadero. The name of her gang/band is the Pinkettes. K. Tan, Southbank VIC.

Terms and Conditions of Entry. 1. The promoter is AJB Publishing Pty Ltd (ACN 083 063 914) of Unit 2-5/44-70 Rosehill Street, Redfern NSW 2016. Promotion period is from 9.00am on 16.10.02 until 12.00pm on 20.11.02. 2. Entry is open to residents of Australia and New Zealand. Management and employees of AJB Publishing Pty Ltd and their immediate families, and any advertising, marketing or promotional firms associated with this promotion are not eligible to enter. 3. Enter by

posting or emailing forms to AJB Publishing Pty Ltd. 4. The draw will be held at the offices of AJB Publishing Pty Ltd at 5.00pm on 20.11.02. Winners will be notified by mail and published in *Atomic 24*. The prizes are not transferable or exchangeable. 6. The judges' decision is final and no correspondence will be entered into. 7. The promoter reserves the right to publish the winner's name and suburb for promotional purposes. 8. All entries will become the property of AJB Publishing Pty Ltd.

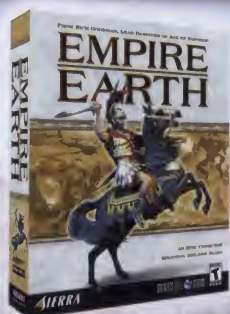
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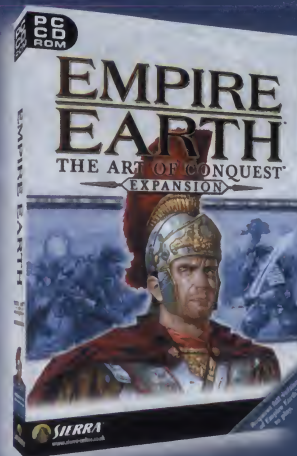


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Letter writing 101

Good morning readers. Today's lesson is *Atomic* Letter Writing 101. As you'll see from the sterling examples below, the key to getting published in these hallowed pages is brevity. The more succinctly you put across your point, the more likely it will get a public showing. We've seen some great letters this month, but if it's two pages long, it just ain't gonna get published. If you remember that good things come in short packages, you too could walk away with cool prizes, like the deluxomatic Logitech Dual Optical Mice (www.logitech.com.au) we're giving away to LOTM.



LOTM: Lick that box into shape

Kudos to Grand Swami Mills for bringing security to the masses in the form of the *Atomic* Firewall – simple, easy to use, actually works. And it doesn't force the poor newbie reader into the depths of madness and confusion that can be 'command line Linux'.

I'm a long time firewall builder and administrator of half a dozen black-box Redhat firewalls for friends as well as my own ub3r Redhat7.3 firewall (with four interfaces – my home network is a little out of control!). I was going through Ashton's Linux article and noticed something in the Squid setup section that will cause some users a bit of grief: after I copied the cachemgr.cgi file as directed, my browser said to me 'Get stuffed, you don't have access to here, sunshine!' when I tried to connect.

A couple of minutes debugging, and a quick check of www.squid-cache.org/Doc/FAQ/FAQ-9.html, I quickly discovered that access to the cachemgr stats is only allowed from the localhost (ie. the firewall itself). I was trying to check the stats from my normal working machine and access was being denied.

Many people may want this box to be the dedicated gateway, silently doing its doberman-packet-chomping firewall thing and managing whopping great squid caches while generating traffic stats, and if you don't have two monitors or a KVM, changing the monitor so you can check some stats is gonna suck after the first few goes. So the simple solution was to allow internal access to the cachmgr.cgi in the form of an additional line in squid.conf. In the 'Recommended minimum configuration' section where it says to only

allow cachemgr access from localhost, add a line saying: 'http_access allow manager mynetwork' (mynetwork was previously defined in the ACLs as per Ashton's instructions. . .). Restart the squid server and <insert appropriate flourish here> voila, access to the cachemgr from any browser on your other machines on your internal network.

Great work guys, particularly Ashton, for making cool technology accessible in a user-friendly way.

Jeff

Ashton's reply: Thanks for the feedback! There is an easier way though: at the cachemgr.cgi login, simply replace 'localhost' with the IP of the Uber box and click 'Continue' (don't supply manager name or password either, btw) and voila, more Squid stats than you could ever hope to want.

POTM: Speed-O

We've been watching with increasing amazement how this *Atomic* tech support thread has grown. Originally started by HCB, who was wanting a CPU speed indicator for his hot box, but was unsure

of exactly what was required, it has attracted the help of a bunch of Atomicans skilled in the arts of electrical engineering. Most impressive though were the lengths that people went to, to help out. This (now huge) thread represents what *Atomic* is all about.

We're giving a one-year *Atomic* subscription to the most special guys in this thread: OwenTheGreat, Yarrago and Goth, plus one for HCB too. Well done guys!

www.atomicmpc.com.au/forum.asp?cat=te&top=38139

Confused

As an *Atomic* reader I have been hearing a lot about Serial-ATA. Would it be possible to replace Ethernet cable with Serial cable, that is going to be used for our hard drives in the near future? With 150 MB/s maximum transfer rate currently, and 300 to 600MB/s later on, this would be a great asset for the general LANning community. As serial cable is not too cumbersome, it would be

no different from Ethernet. If this was the case serial cable could be able to completely take over the entire world if it replaced USB and FireWire and any other data transfer mediums. This would be great for us, as the consumer, but it would most likely send some companies out of business.

Ebola

Serial ATA technology is designed solely for use with hard drives, and was not

created with LANs in mind. If you want high bandwidth on your LAN, we have more than enough for gaming in the form of Gigabit, and even FireWire, LANs.

Bugger this

I just read Tim Dean's article *Bug out* and have one question: have you not seen Neocron, the new MMORPG? OK, maybe it's not as life-changing as discovering an insect for the first time at age 17, and maybe it's sorta Deus Ex-ish in game play

and look. But I think Neocron's a step in the right direction for online games. Usually I find *most* RPGs tedious and rather boring after a while. However, after playing the public beta test of Neocron, I'm hooked! I won't dribble on about all the different features and angles of character development, I'll just say that it seems close to what Tim was crying out for. I know it doesn't really mesh different game engines together, but the FPS-style combat and being able to choose to make your character a researcher, constructor or hacker instead of, or as well as, a fighter, is a great change in RPGs. Along with the sci-fi/cyberpunk storyline, the different 'Factions' (big businesses) and the Clans (teams of players), make it a fresh game. I'd love to see a review of it in your next issue. It reminds me of *Blade Runner* crossed with *1984*, with the constant voice-over in the city (Neocron) advertising the factions, reminding you how lucky you are to be a citizen and how wonderful life is, with phrases like 'Tangent - In Guns We Trust' and 'Proto-Pharm - your hope, your strength, your cure'.

Hope to see a review soon.
ThaDark

P.S. Love the mag, it has knocked *Viz* & *Zit* magazines off the perch of my fav mags, and Dan Rutter has replaced Acidhead Arnie as my favourite mag character, even if he is a real person, not a character. Though I have my doubts.

ROFLMAO

I wouldn't usually make the effort to email the editor of a magazine, but when I read the *Beat the WAN curse* title about the Linux project on the cover of *issue 21*, I pissed myself laughing all the way from the mailbox to my lounge room. I tried to tell my housemates about the joke, but couldn't manage to get the sentence out without bursting into laughter.

I don't know why it's so funny, but it is. Definitely the funniest thing I've ever seen on the cover of a magazine. Please pass on my thanks to those responsible. It made my day. The weirdest part: the more I think about it, the funnier it gets. I think I need to lie down. Thanks again, and keep up the great work!
John D (aka DeeMan).

Oops, we did it again

I have just picked myself up off the floor after reading page 46 of *issue 20* and noting that the VisionTek Xstacy GF4 Ti4600 has a memory speed of 6000MHz! Sweet! I think you might be teasing us with this though (say it isn't

true) else the comparison graphs must be wrong (I am picturing how a card with 10 times the normal memory speed would compare and have to wipe the dribble off my collar).
Terry Wescombe

Don't you hate what a single accidental O character can doo too results?

Sub standard

I read the submariner article posted on the Website - you cats obviously don't get out in subs much! To my knowledge, the US nuclear fleet subs (they only have three diesel subs) use NT4 as an operating system (wonder if they still get support from MS?) so I just wonder what kind of games they can play on that platform, (anyone for Solitaire?) or have they finally upgraded without my/our knowledge. They *are* sneaky bastards.

Locally we have had difficulty coming up with a reliable and all encompassing combat system for the Collins Class boats, which are incidentally, despite the reported problems, probably the best boats in the world. They are certainly the largest conventional boats and are about to become among the quietest. The combat, nav and operating systems aboard are certainly very impressive (beautiful TFT screens all round, steer with a four-inch-high joystick!), and visually stimulating. Don't know all that much more about that side of things with Subcorp, but I am aware that it is heavily invested in Mac platforms. I think there is a simulator in the wires somewhere too. I love the smell of diesel in the morning.
Robert Scott

Thanks Dude

G'day mate, I was reading the latest copy of a mate's mag and saw the article of the dude who had the CUSL2-C motherboard and when overclocked from 933MHz to 1GHz they couldn't get 4x AGP. Well, that person had the same problem as I did, and after your recommendation of keeping the FSB at or below 140 I can safely say their problem is fixed, as is mine. Thank you *Atomic*.
Dude

Love those tubes

I thought you would like to have a little more background knowledge on these little beauties. Back in the Dark Age, when the Cold War was still happening, the Americans went with the silicon chip but the Russians stayed with the valve, miniaturizing it to the size of a standard dielectric capacitor. They perfected them

so much so that the MIG-29 uses them through its Flight Control and various other systems. Why did they do this? Well, the pn junction inside of any silicon chip breaks down when subjected to an EMP (Electro Magnetic Pulse) while the vacuum tube keeps on keeping on, so if you have a shit load of American planes flying around, just set off a nuke in the atmosphere and watch them all crash and burn, along with their missiles, but the Russian planes will be left untouched.

JukeXbox

I recently bought myself an Xbox (primarily to play DVDs) and thought to myself, wouldn't it be cool if I used the Xbox as a jukebox with all of my music tracks stored on the hard drive. I copied four CDs over to the hard drive, and checked to see how much room was taken up. Four CDs took up around 10,000 blocks. The Xbox hard drive shows that there are 50,000 blocks that can be used. What the? I can only store 20 CDs? There has to be a way to add a larger hard drive! Here are some issues with using the Xbox as a jukebox:

- Drive capacity, 8GB isn't nearly enough to store a 100 CD collection.
- Adding a larger internal drive would void my warranty, as it would involve removing the cover of the Xbox. At least people have released tools to be able to create Xbox file systems and copy the dashboard back to the drive.
- The Xbox will not read CD-R discs. Apparently you have to use a mod chip to be able to read these discs. Unfortunately, a lot of music that I own is on vinyl, and I have had to burn it onto CD to be able to play it in the car (in-dash record players aren't available, funnily enough). Also, a few of my original CDs have met a painful death involving screwdrivers and a glove box, but I won't bore you with the details.
- The farking DVD remote doesn't work properly with the media player. A small oversight, but is it too much to ask for the remote's Play and Skip track buttons to work with CDs and DVDs?

What would be really good is if a network or USB drive could be connected to the Xbox (say about 120GB's worth) so I can play all of my CDs stored in the Xbox. Whether this will be the case in the future, who knows?

Tim Norman

Knowing Microsoft, we wouldn't be at all surprised if external hard drives for the Xbox became available. Unfortunately there's no news of one yet, but we'll let you know as soon as we hear about it.

Pubic transport

It was recently reported that a Zurich scientist has found human sperm may be more intelligent than previously thought.

This, to me, came as no surprise. I'd always considered the whole conception thing as one big treasure hunt: like swimming the Tasman Sea in thick fog, not knowing where you're going, looking for a blind date shaped like a huge omelette. For even one of those guys to hit the mark, let alone seduce a girl fifty times bigger than their heads, I figure they would need some form of intelligence.

Peter Brugger, neurobiologist and full time sperm watcher (put that on a business card!) has apparently shown just that. Using Swiss-made semen, Brugger made the sperm swim little mazes and recorded which way they went. Mysteriously, the little guys seemed to remember which way they were going. If they turned left at one corner, the next turn they'd go right, and vice versa. This implies a simple directional memory that scientists only thought existed in more complex cell structures, such as buttered bread, falling cats and airline cabin crew.

What's that got to do with a computer magazine? Glad you asked. This research raises new possibilities in the field of artificial intelligence: if a single cell is capable of navigation, perhaps we can build a simple circuit to do the same. Navigation has always been one of the tricky things in AI. Sure, AIBO can find the red ball, but get him

to drive a bus down Parramatta Road in peak hour and there's sure to be tears. We've always thought that robots should be able to see and understand the world around them in order to interact with it, yet maybe that's not the case. Maybe they don't even need sensing devices – just a basic understanding of their role and eventual goal. It worked for Natasha Stott Despoja (oh, hang on – bad example) so maybe it could for the next breed of robots.

Many of the current robots use thinking processes based on insect intelligence: insects deal with large amounts of complex information in very simple ways. When a bee sees a sunflower, it simply equates this to a yellow band around a dark target. When a giant spider sees my fifth level paladin, it equates snack pack. When my mother in law sees my computer equipment, she's really seeing money poured down the drain and a lack of grandchildren. Yes, insects can be quite nasty.

Now, however, this approach could be simplified even further. Like sperm, we could build robots with one unequivocal goal – then we just point 'em in the right direction and watch the buggers go.

Imagine a public transport system where you get on, knowing you need to end up at a big square building (your home) in a certain direction (north) in a certain amount of time (before *Friends* starts). The vehicle thrashes its way through peak hour with other similar

vehicles, turning left, then right, but always heading in the right direction. Sure, most of the vehicles will break down along the way, and some will end up going in completely the opposite direction, but you could eventually get to your house.

I quite like this scenario, despite its obvious flaws (ie: we all end up at the same house, and only one person is allowed in). But it creates a new role for men in an increasingly matriarchal society. Perhaps instead of buying a ticket, your contribution to the sperm bank is enough to qualify for five million free trips. Every donation gets you a mention in the *Transport Weekly*. And after fifty donations you get a lapel pin or a brass plaque naming you a 'Proficient Sperm'.

About now I imagine a lot of the guys out there are throwing down their copies of *Atomic* and saying: 'No way am I giving away my sperm to improve public transport!' To these guys I say, don't worry. Your sperm are safe where they are (at least until next Saturday night). We won't need actual sperm once scientists decode the method by which they navigate. That very simple instruction set may be enough to guide all new robots into the next golden age – or at least to the nearest omelette parlour.

So next time you see a bus driver, just point to your crotch and say: 'Don't worry. Your job's in safe hands.'

John Simpson



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